PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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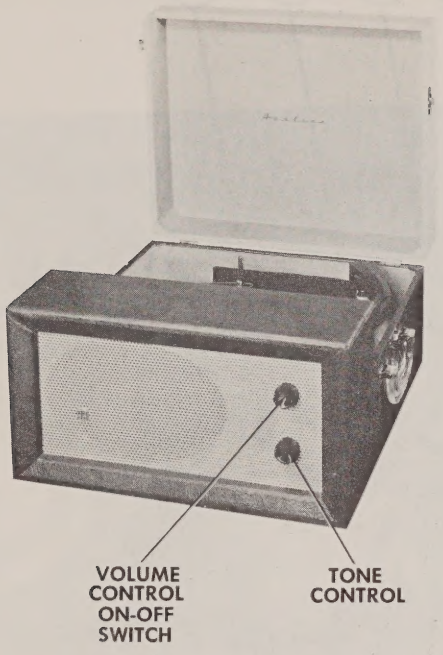
AIRLINE
MODELS 35GDC998A, B

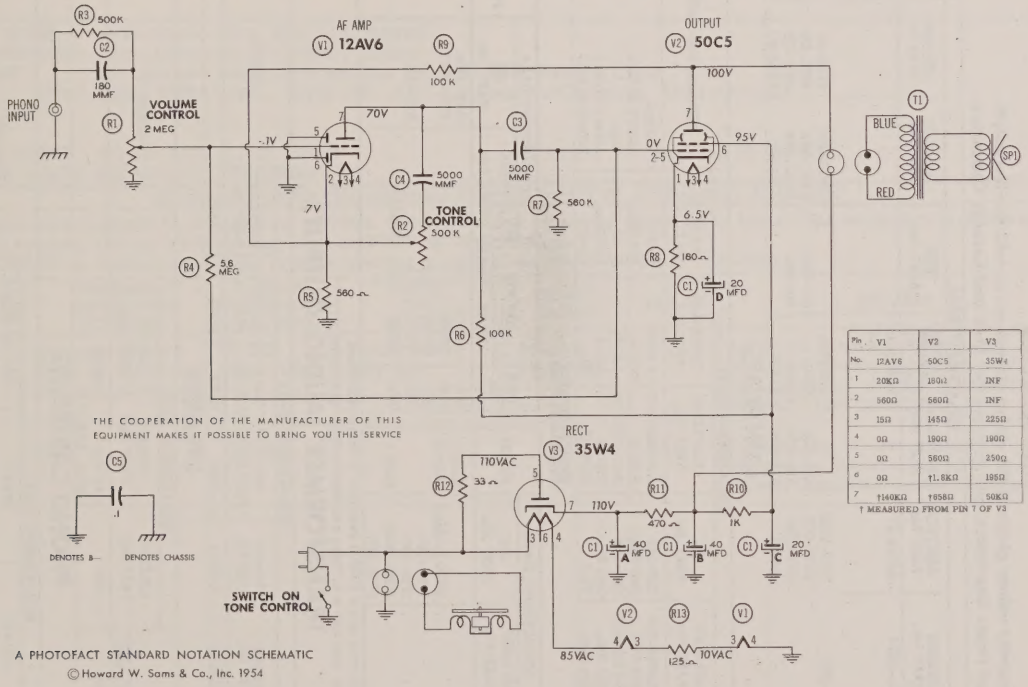
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

AIRLINE
MODELS 35GDC998A, B



TRADE NAME	Airline Models 35GDC998A, B
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AV6 AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .22 Amp. @ 117 Volts AC

RECORD CHANGER UNITS - MODEL 35GDC998A - V-M MODEL950
MODEL 35GDC998B - V-M MODEL 940
SEE V-M MODEL 950-PHOTOFACT SET #216, FOLDER 11 OR RECORD CHANGER MANUAL CM-5 FOR SERVICING INFORMATION. (MODEL 940 IS VERY SIMILAR WITH THE EXCEPTION OF THE AUTOMATIC SHUT-OFF SWITCH AND RECORD HOLD ARM ASSEMBLY.



Pin	V1	V2	V3
No.	12AV6	50C5	35W4
1	20KΩ	180Ω	INF
2	560Ω	560Ω	INF
3	1MΩ	145Ω	225Ω
4	0Ω	190Ω	190Ω
5	0Ω	560Ω	250Ω
6	0Ω	†1.6KΩ	195Ω
7	†140KΩ	†958Ω	50KΩ

† MEASURED FROM PIN 7 OF V3

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	12AV6	12AV6	7BT	
V2	Audio Output	50C5	50C5	7CV	
V3	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150	MEL-4234	AFH4-27		BBRQ443-15C				Red
B	40	150								Blue
C	20	150								Yellow
D	20	25								Blue
C2	180	500	CA-180	1479-0002		22R5T18		MCE237	1FM-32	
C3	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C4	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C5	.1	400		489ZX-1	DF-104	PJ4P1		PT401	4TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	BA011-1217	Q13-139	A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	500KΩ	½	BA012-352	Q13-133	A47-500K-Z	AB-60	U-48	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R2B

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R3	500KΩ	½			Note 1
R4	5.6Meg	½		BTS-5.6Meg	Note 2
R5	560Ω	½		BTS-560	
R6	100KΩ	½		BTS-100	
R7	560Ω	½		BTS-560K	Note 1
R8	180Ω	½		BTS-180	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R9	100KΩ	½		BTS-100K	
R10	1000Ω	½		BTS-1000	
R11	470Ω	½			
R12	33Ω	½		BTS-33	
R13	125Ω	5	R-125-5		

Note 1. Some models may use a 470KΩ resistor in this application.
Note 2. Some models may use a 4.7Meg resistor in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.5Ω	Part of Spkr.	A-3876	A-2928	S-2X	Z1103	24S50	

SPEAKER

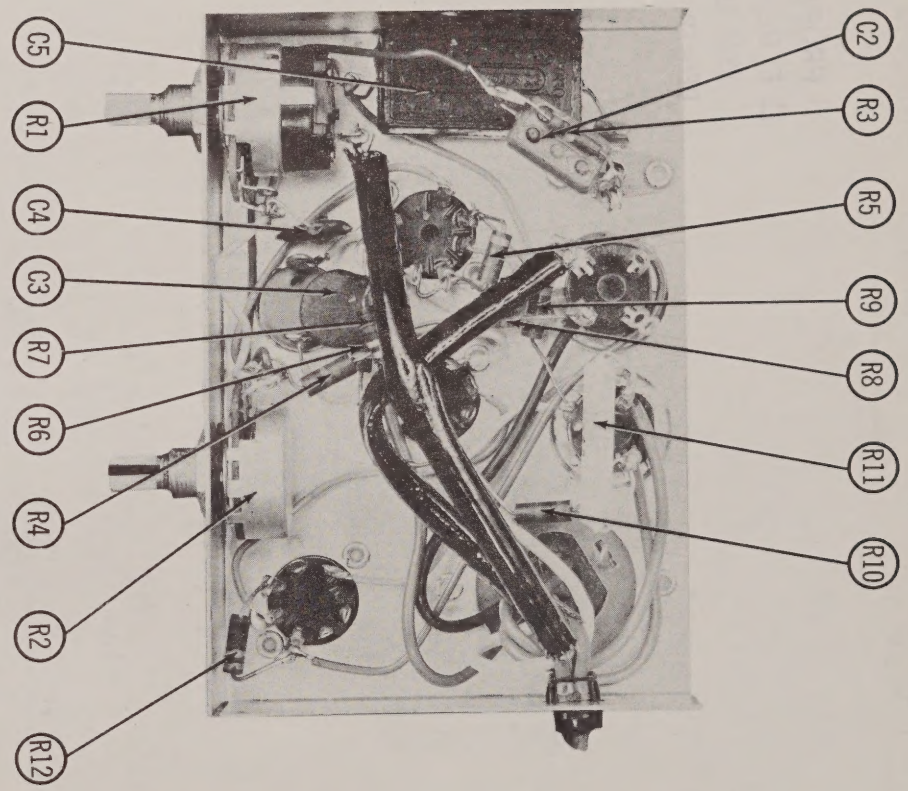
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6 x 9"	PM	3.5Ω	C-790	ST-810 Mod. P69-V	69A2	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	AIRLINE PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	60H20 or 60H21	AC-AG-J	A-AG	W26B	A66W	33	0-2 or S-2	

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	AIRLINE PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	*61H11 (or) †61H14	*JP-312 (or) †JPS-312	*B-306 (or) †B-335 (or) ♦ B-335D	*W-30AGA (or) †W-31AGS	For Cartridge Part No. 60H20
	*61H12 (or) †61H15	*E-962 (or) †E-902	*B-307 (or) †B-346 (or) ♦B-346D	*W-20AGA (or) †W-21AGS	For Cartridge Part No. 60H21

* Metal † Jewel ♦ Diamond

ARVIN MODELS
848T, 849T (Ch. RE369)

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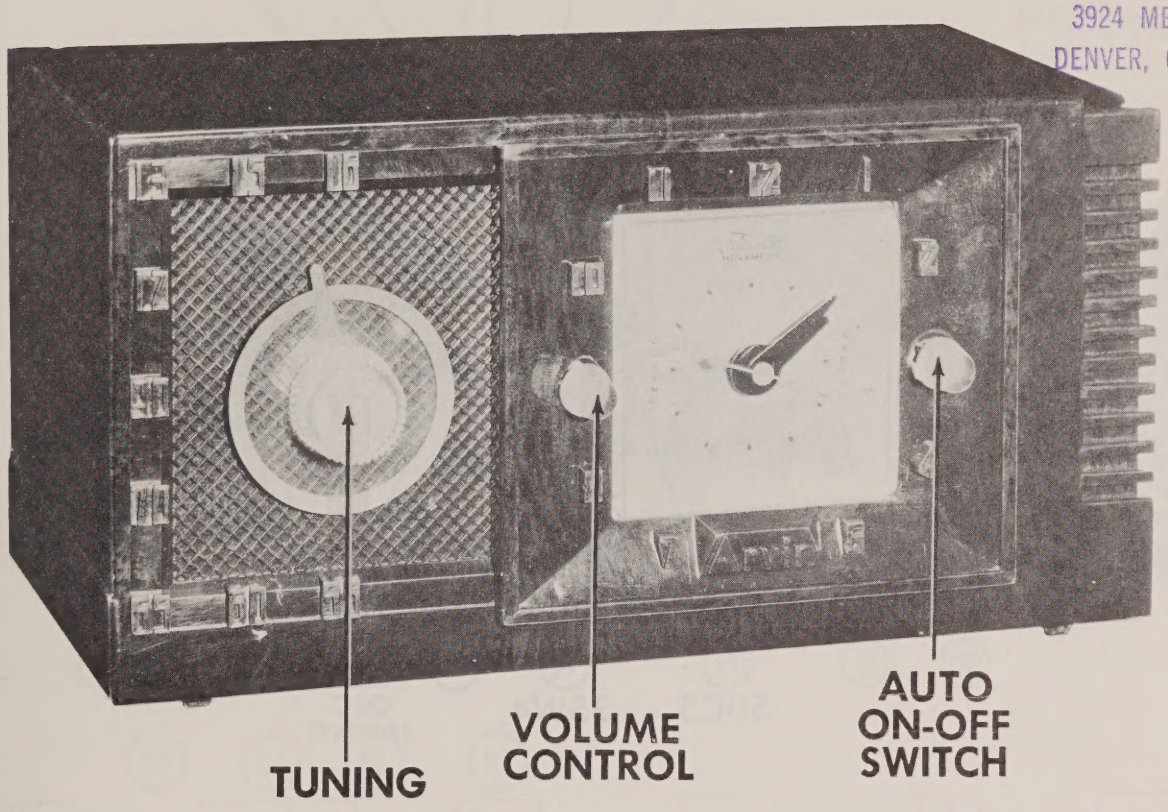
ARVIN MODELS
848T, 849T (Ch. RE369)



ARVIN MODELS
848T, 849T (Ch. RE369)

TRADE NAME	Arvin Model 848T, 849T (Ch. RE369)
MANUFACTURER	Arvin Industries, Columbus, Indiana
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES	(Four) Types 12BE6 Conv., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400% Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

ARVIN
MODEL 848T (Ch.RE369)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V3	Output	50C5	50C5	7CV	
V4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■50	150	40736	AFH3-77		C056		FP310	TVL-3424	
B	▲30	150								
C	20	25								
C2	47			BPD-00047	SI47	G033	GP1K-470	UC-5447	5GA-Q47	Note 1
C3	6									
C4	20000		40053-203	BPD-02	DD-203	K085		DC-512	5HK-S2	
C5A	220									
B	2000									
C	5000		♦41696	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
D	250									
E										
C6	10000		40053-103	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	20000		40053-203	BPD-02	DD-203	K085		DC-512	5HK-S2	
C8	20000		40053-203	BPD-02	DD-203	K085		DC-512	5HK-S2	

Note 1. Not used in all Models.
♦ Items C5A, C5B, C5C, C5D, C5E, R4A, R4B and R4C are combined in one unit.
When replacing items separately items C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	1Meg	½	A41558					Volume

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R2	22KΩ	½	20061-223	BTS-22K	
R3	2.2Meg	½	20061-225	BTS-2.2Meg	
R4A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦	BTS-470K	
C	470KΩ	½		BTS-470K	

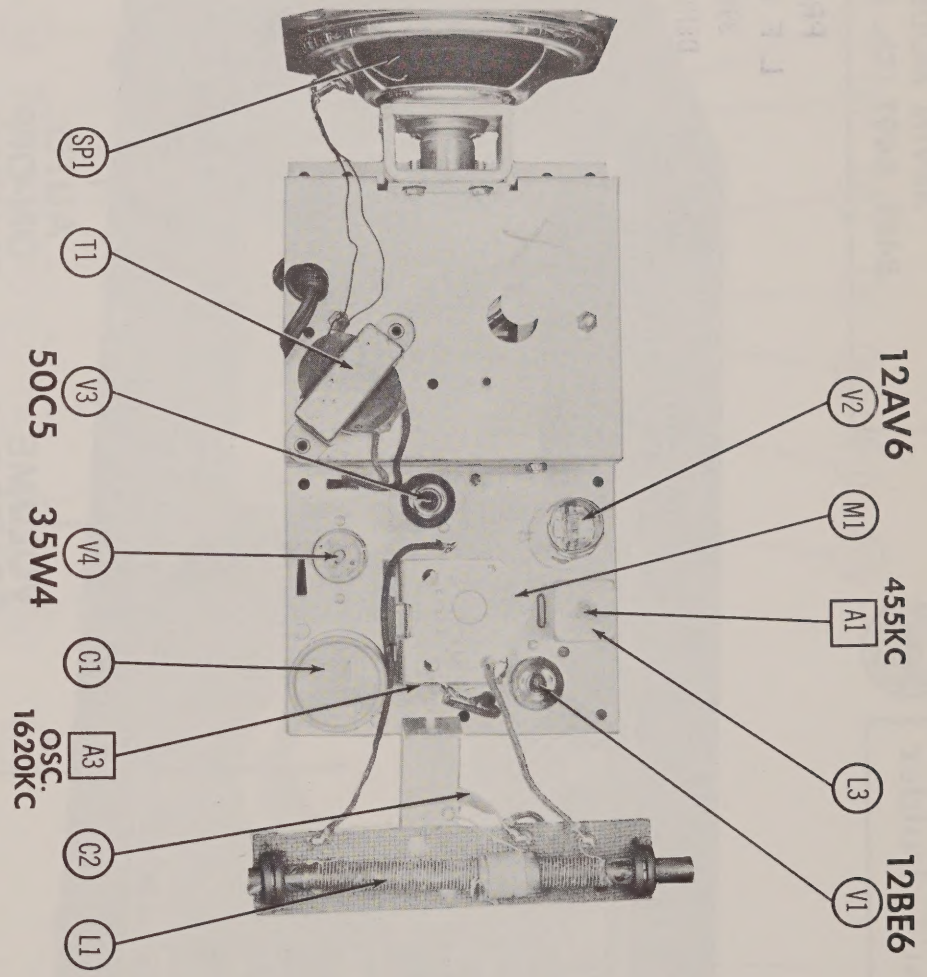
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R5	120Ω	½	22381-121	BTS-120	
R6	2200Ω	1	20070-222	BTA-2200	
R7	47Ω	2	42235	BTB-47	
R8	330KΩ	½	20061-334	BTS-330K	

♦ Items R4A, R4B, R4C, C5A, C5B, C5C, C5D and C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ARVIN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.3Ω	41706-1	A-3332	A-3025	S-12X	Z1101	26S58 ①	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	41629	ST-113 Mod.P4-X	4A07	

COILS (RF-IF)

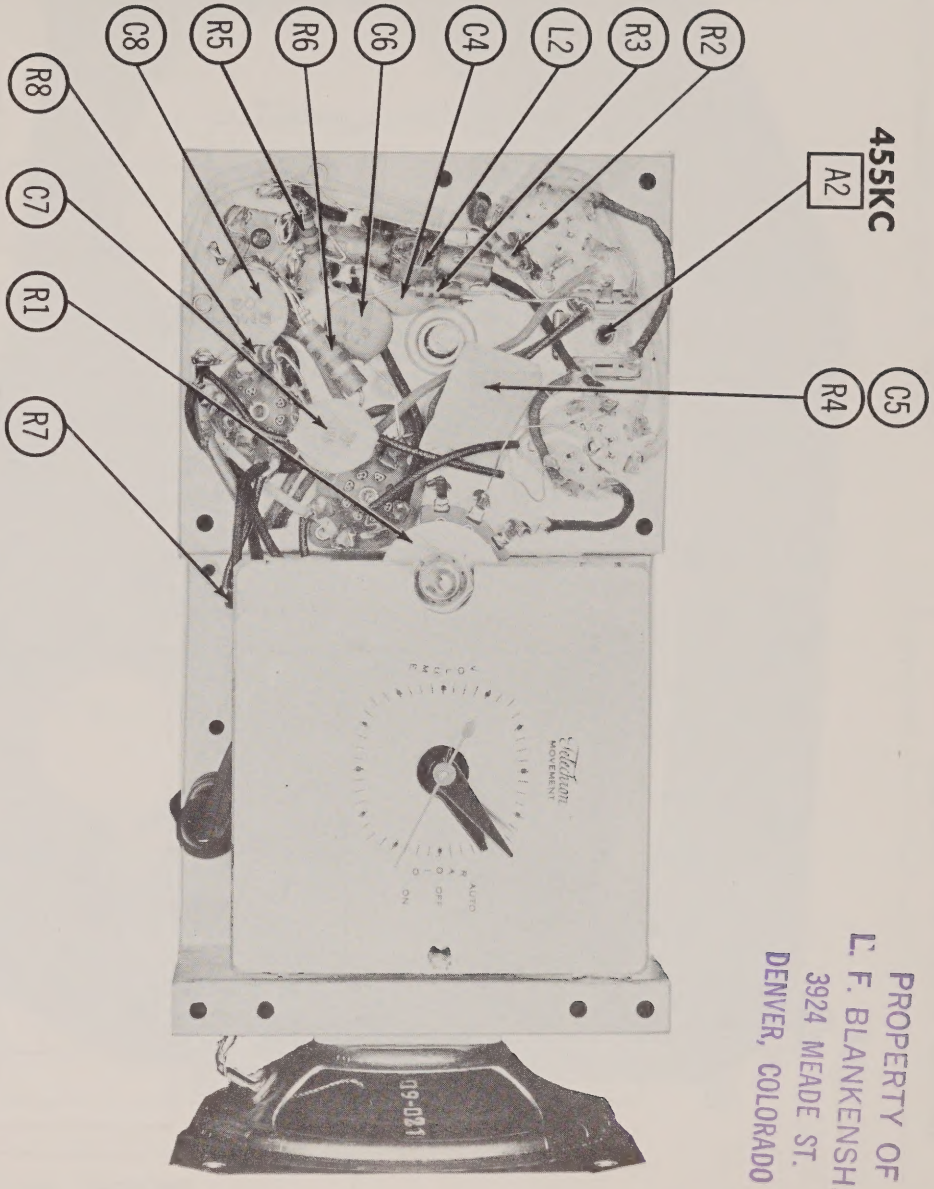
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.8Ω	.3Ω	41695-1				
L2	Osc. Coil	.8Ω	8.5Ω	41707-1	14-1073		69-Osc.■	
L3	IF Trans.	18Ω*	18Ω	41168-3				

* Tapped @ 1.5Ω
■ Drill mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	Tuning Cap.	41538	10-280MMF, 10-110MMF
	Cabinet	41673-1	Ivory - Model 849T
	Cabinet	41673-2	Bitter Green - Model 849T
	Cabinet	41673-3	California Tan - Model 849T
	Cabinet	41673-4	Rosewood - Model 848T
	Knob	41607	Tuning
	Knob	41606	Dial Pointer
	Knob	25233-3	Clock & volume
	Timer	41633-1	Clock
	Clock Crystal	41531	

CHASSIS—BOTTOM VIEW



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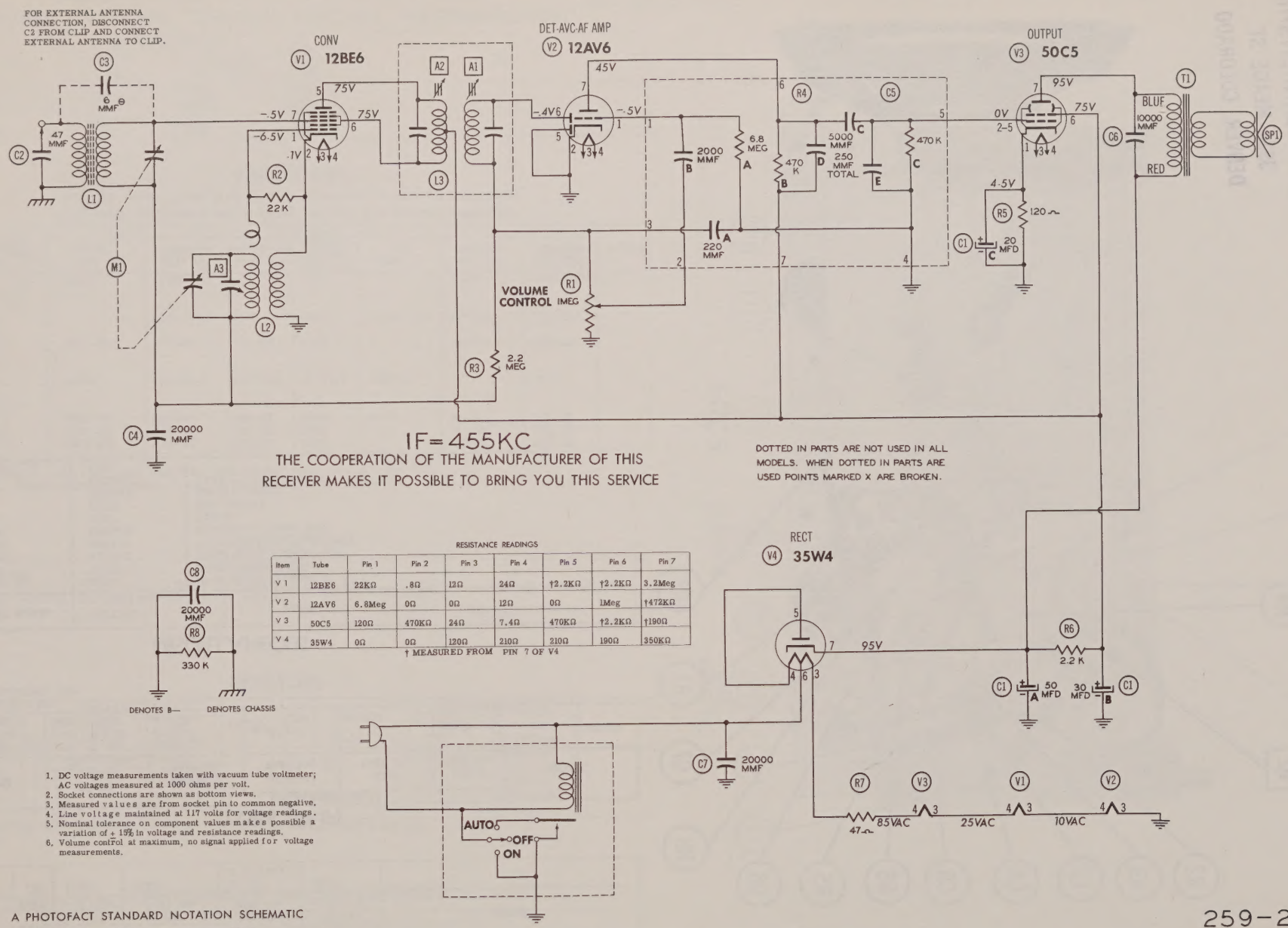
ARVIN
MODEL 848T (Ch.RE369)



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.8Ω	12Ω	24Ω	†2.2KΩ	†2.2KΩ	3.2Meg
V 2	12AV6	6.8Meg	0Ω	0Ω	12Ω	0Ω	1Meg	†472KΩ
V 3	50C5	120Ω	470KΩ	24Ω	7.4Ω	470KΩ	†2.2KΩ	†190Ω
V 4	35W4	0Ω	0Ω	120Ω	210Ω	210Ω	190Ω	350KΩ

† MEASURED FROM PIN 7 OF V4

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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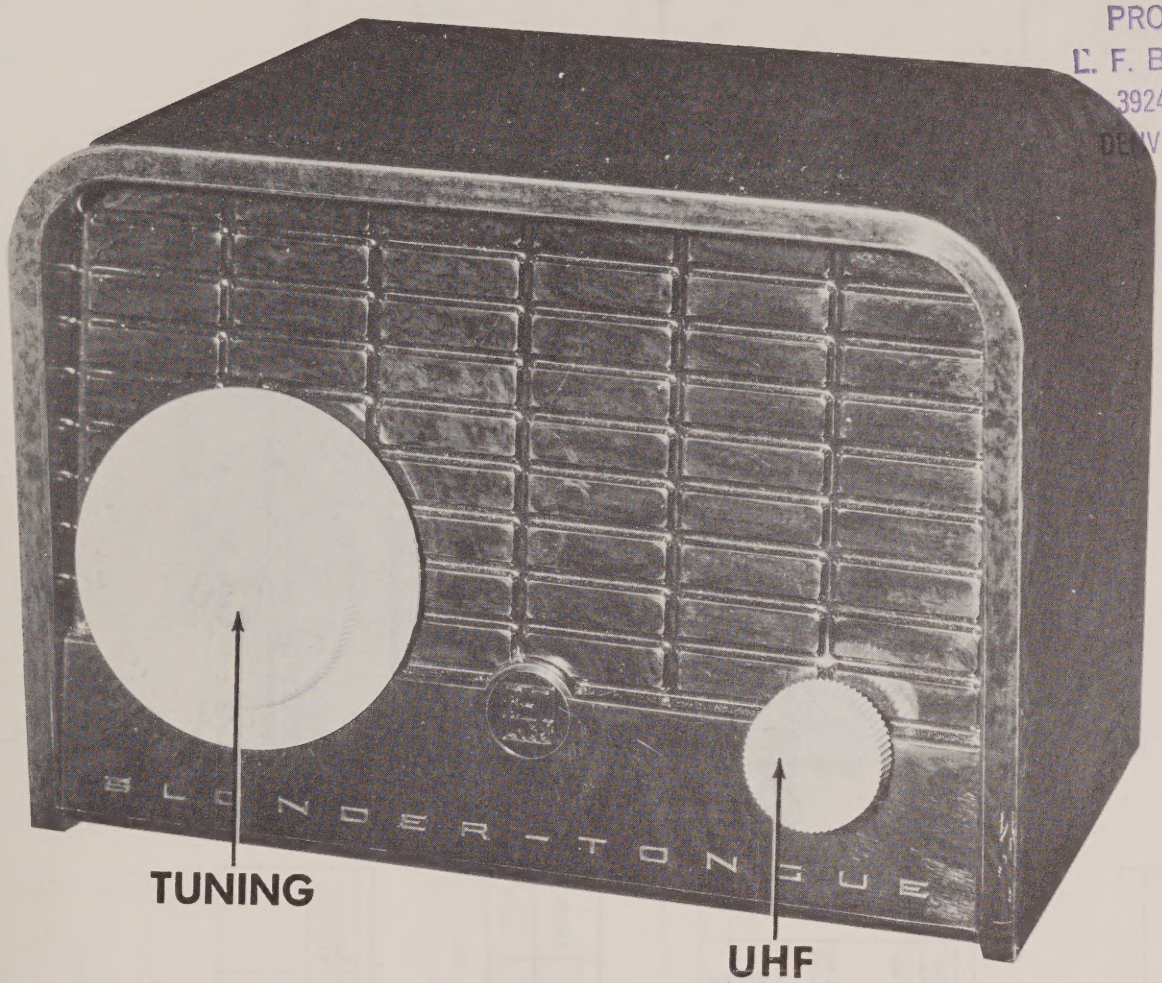
BLONDER-TONGUE
MODEL 99 (UHF Conv.)



BLONDER-TONGUE
MODEL 99 (UHF Conv.)

TRADE NAME	Blonder-Tongue Model 99
MANUFACTURER	Blonder-Tongue Laboratories, Inc., Westfield, N.J.
TYPE SET	AC Operated All Channel UHF Converter
TUBE	Type 6AF4 Oscillator (6T4 Alternate)
POWER SUPPLY	110- 120 Volts AC-60 Cycles RATING .05 Amp. @ 117 Volts AC
TUNING RANGE	Channels 14 thru 83

THIS UNIT IS PRE-ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT SHOULD NOT BE REQUIRED IN THE FIELD.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Blonder-Tongue PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6AF4	6AF4	7DK	6T4 used as an alternate

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	Blonder-Tongue PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	20	150		PRS150/20-20		BBRD2215		TCD45	TVA-2428	
B	20	150								
C2	.82									
C3	.82									
C4	1.5			SI1.5NP0	TCZ-1.5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C5	1.5			SI1.5NP0	TCZ-1.5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C6	4.7			SI4.7NP0	TCZ-4.7	Z010	NP0A-4R7	ZT-555	5TCCB-V47	
C7	4.7			SI4.7NP0	TCZ-4.7	Z010	NP0A-4R7	ZT-555	5TCCB-V47	
C8	10			SI10NP0	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C9	10			SI10NP0	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C10	10			SI10NP0	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C11	10			SI10NP0	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Blonder-Tongue PART No.	IRC PART No.	
R1	15KΩ	½		BTS-15K	
R2	1500Ω	1		BTA-1500	

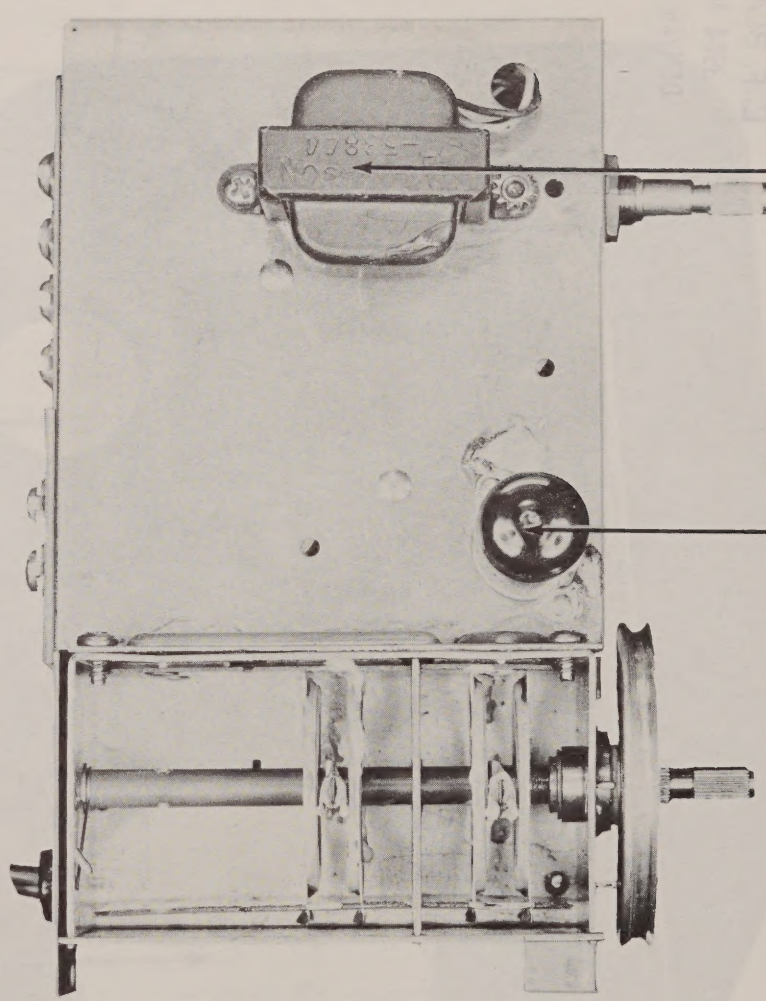
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Blonder-Tongue PART No.	IRC PART No.	
R3	100Ω	½		BTS-100	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Blonder-Tongue PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .05A tap @ 6.3VAC @ .23A				T9	PS-8415 ① ②	P-2944①			

① Transformer has separate filament winding.
② Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Blonder-Tongue PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	UHF Osc. Coil	0Ω						
L4	UHF IF Coupling	0Ω						
L5	UHF RF Choke	0Ω						
L6	UHF RF Coil	0Ω						
L7	UHF Fil. Choke	0Ω						
L8	UHF Fil. Choke	0Ω						
L9	UHF RF Choke	0Ω						

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: Blonder-Tongue PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.015ADC		1159 ①	CR-38 ①	8S20	50	8Y1	① Add mounting lugs to mount selenium

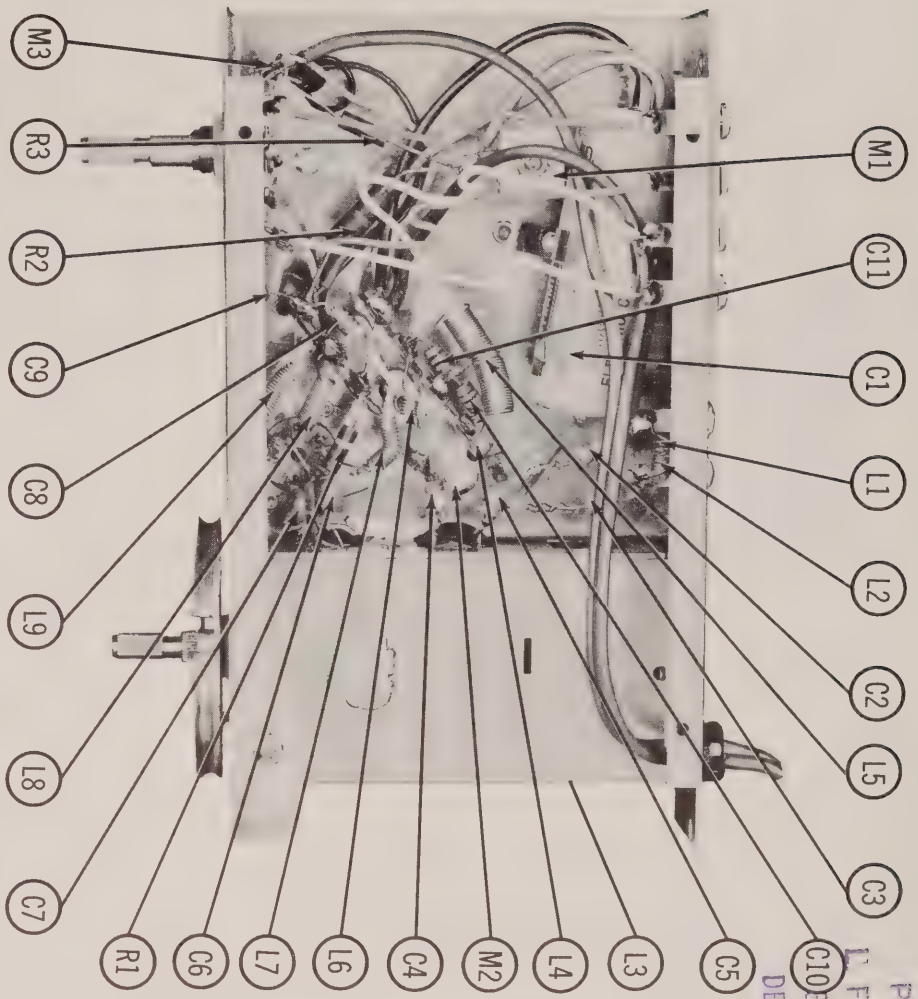
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: Blonder-Tongue PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M2	TS-3		1N82 or 1N82A		UHF Mixer

MISCELLANEOUS

ITEM No.	PART NAME	Blonder-Tongue PART No.	NOTES
M3	Switch		VHF-UHF

CHASSIS—BOTTOM VIEW



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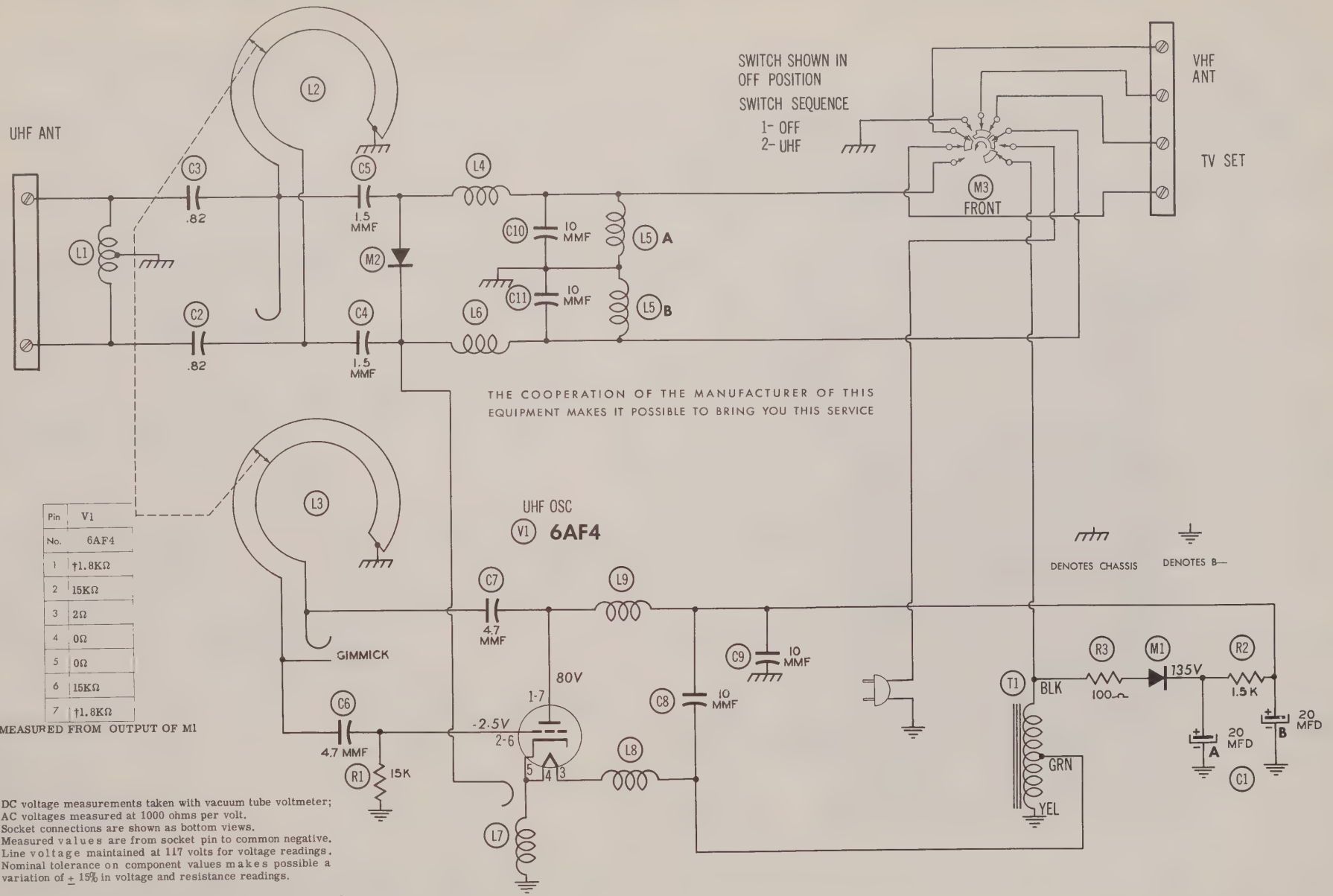

Pin No.	V1 6AF4
1	†1.8KΩ
2	15KΩ
3	2Ω
4	0Ω
5	0Ω
6	15KΩ
7	†1.8KΩ

†MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

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DAVID BOGEN MODELS VP17, X

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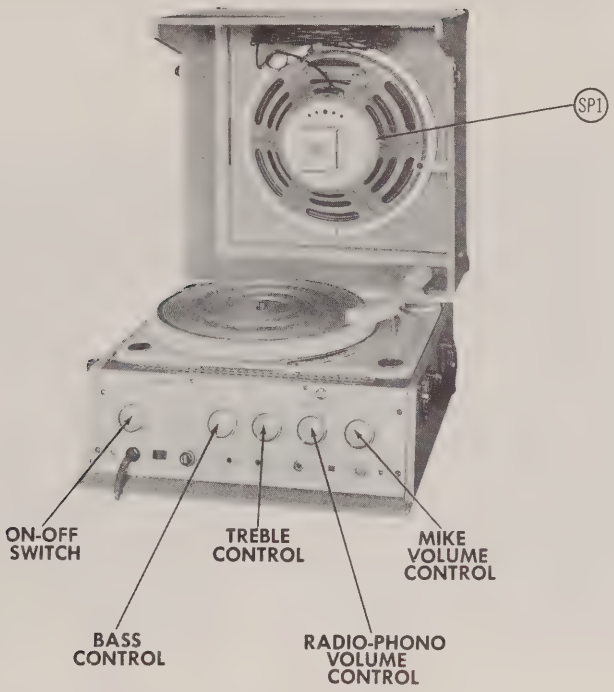
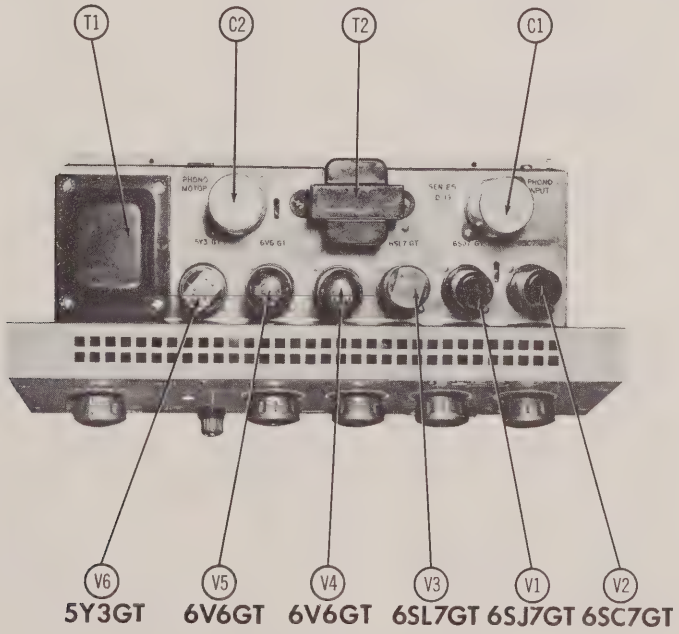
DAVID BOGEN
MODELS VP17, X



TRADE NAME	David Bogen Models VP17, VP17X
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N.Y.
TYPE SET	AC Operated 2 Channel Audio Amplifier With 3 Speed Manual Record Player
TUBES (Six)	Types 6SJ7 Phono Pre-Amp., 6SC7 Mic Pre-Amp.-AF Amp., 6SL7GT Phase Inverter, (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .6 Amp. @ 117 Volts AC



CHASSIS TOP VIEW

DAVID BOGEN
MODELS VP17, X

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PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL VP17

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		David Bogen PART No.	STANDARD REPLACEMENT		
V1	Phono Pre-Amp.	6SJ7	6SJ7	8N	Used in Model VP17X only
V2	Mic-Pre-Amp. - AF Amplifier	6SC7	6SC7	8S	
V3	Phase Inverter	6SL7GT	6SL7GT	8BD	
V4	Audio Output	6V6GT	6V6GT	7S	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲10	450		AFH4-09		D008		WP433.6	R1508	
B	▲10	450								
C2A	■5	450		AFH4-09		D008		WP433.6	R1424	
B	▲5	450								
C	▲5	450								
D	5	450								
C3	100	25		PRS25/100		BRH251		TC2501	TVA-1207	
C4	10	25		PRS25/10		BR102		TC22	TVA-1204	
C5	50	50		PRS50/50		BR505		TC39	TVA-1308	
C6	.02	600		P688-02	DF-203	CUB6S2		PT612	6TM-S2	Note 2
C7	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	Note 2
C8	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	Note 2
C9	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	Note 2
C10	.03	600		P688-03		CUB6S3		PT613	6TM-S3	Note 2
C11	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C12	.002	600		P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C13	.05	600		P688-05	DF-503	CUB6S5		PT615	6TM-S5	
C14	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C15	.03	600		P688-03		CUB6S3		PT613	6TM-S3	
C16	.03	600		P688-03		CUB6S3		PT613	6TM-S3	
C17	.047	400		489ZX-047	DF-503	CUB4S47		PT4147	4TM-S47	
C18	.002	600								Note 1

Note 1. Used in Model VP17 only.
Note 2. Used in Model VP17X only.

CONTROLS

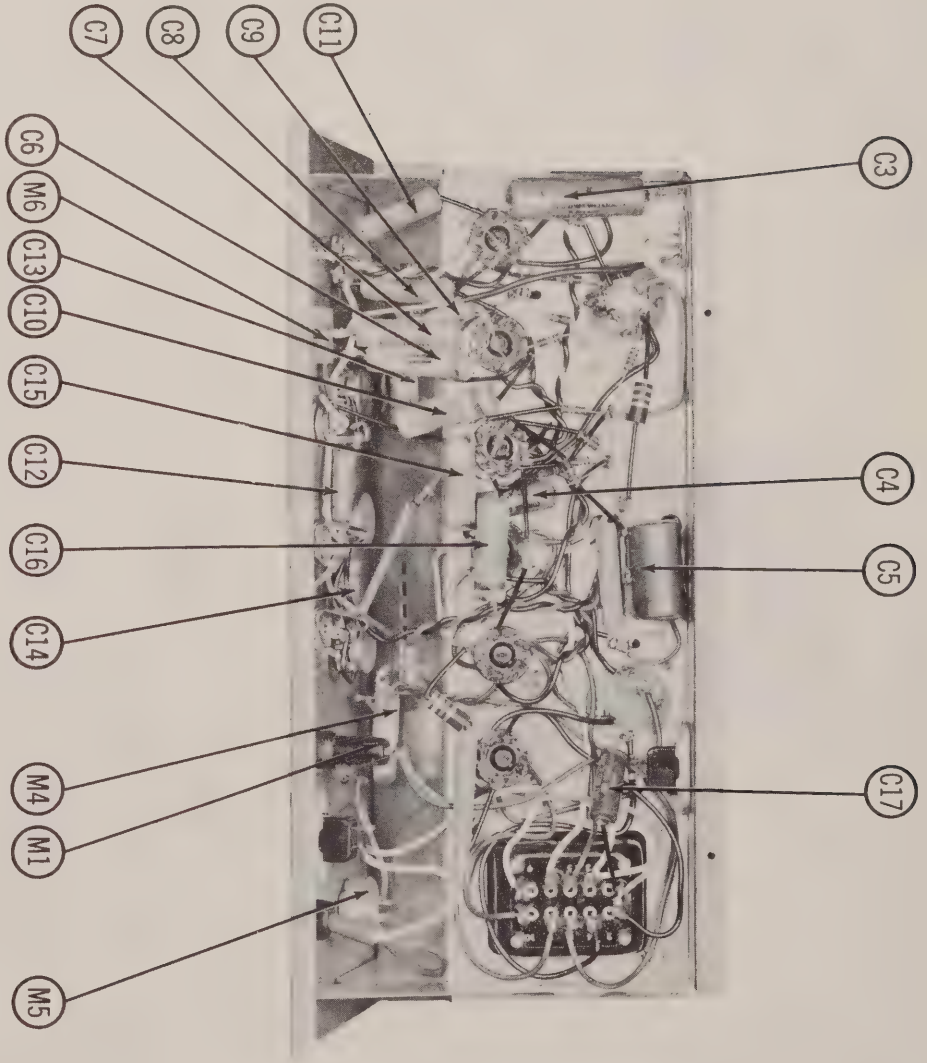
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	David Bogen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	V202V	Q13-133	A47-500K-Z	B-60	U-48	Microphono -volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	½	V202V	Q13-133	A47-500K-Z	B-60	U-48	Phono & Radio -volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	V202V	Q13-133	A47-500K-Z	B-60	U-48	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	500KΩ	½	V202V	Q13-133	A47-500K-Z	B-60	U-48	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R5	8200Ω	½		BTS-8200	
R6	47KΩ	½		BTS-47K	
R7	1Meg	½		BTS-1Meg	
R8	1Meg	½		BTS-1Meg	
R9	220KΩ	½		BTS-220K	
R10	10KΩ	½		BTS-10K	
R11	20KΩ	½			
R12	470KΩ	½		BTS-470K	
R13	150KΩ	½		BTS-150K	
R14	470KΩ	½		BTS-470K	
R15	220KΩ	½		BTS-220K	
R16	1000Ω	½		BTS-1000	
R17	82KΩ	½		BTS-82K	
R18	10KΩ	½		BTS-10K	
R19	82KΩ	½		BTS-82K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R20	20KΩ	½			
R21	1000Ω	½		BTS-1000	
R22	220Ω	½		BTS-220	
R23	150KΩ	½		BTS-150K	
R24	47KΩ	½		BTS-47K	
R25	150KΩ	½		BTS-150K	
R26	3300Ω	½		BTS-3300	
R27	220KΩ	½		BTS-220K	
R28	270KΩ	½		BTS-270K	
R29	270Ω	2			
R30	47KΩ	2		BTB-47K	
R31	4700Ω	½		BTS-4700	
R32	330Ω	7		1 3/4A-300	
R33	3300Ω	2		BTB-3300	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.6A	700VCT .072A	5VAC @2A	6.3VAC @1.7A	T-362-1	PM8409	P-2952	R-11B	P9311	TS-24R04

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	6KΩ CT	8Ω tap @ 4Ω	T-265-2					22S58	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	David Bogen PART No.	JENSEN PART No.	QUAM PART No.	
SP1	12"	PM	8Ω		ST-101 Mod. P12-T	12A6	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1.5A 250V			31201.5 (3AG-1.5A)	342001	AGC 1 1/2	HKP

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	David Bogen PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2								

PHONO NEEDLE

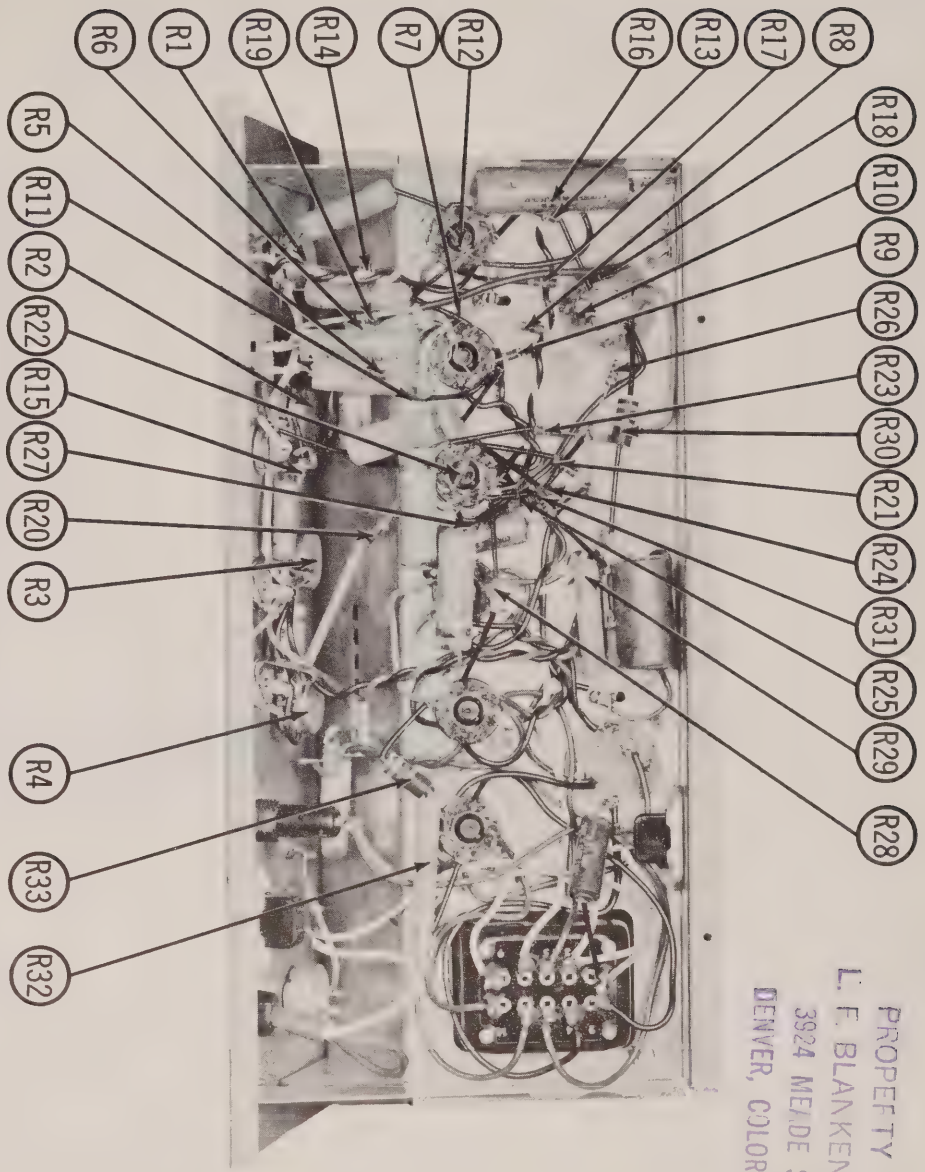
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	David Bogen PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M3		*GE-11	*AC-410 *♦AC-410D1 ♦AC-410D	*W-66TPS	*Jewel Tip ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M4	Dial Light		#47
M5	Switch		Power
M6	Switch		Scratch Filter

CHASSIS—BOTTOM VIEW



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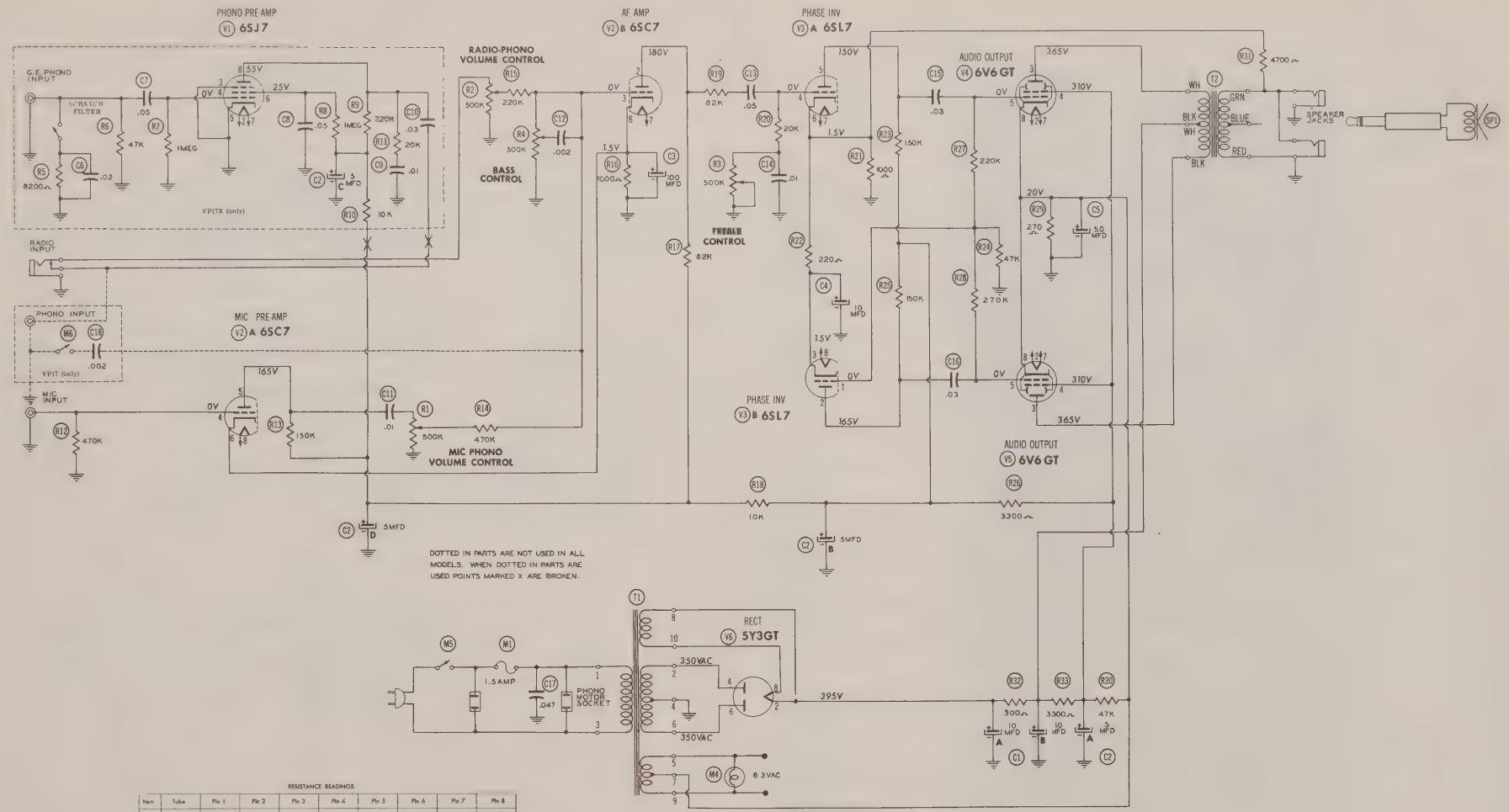
DAVID BOGEN
MODEL VP17



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SJ7	0Ω	270Ω	0Ω	1Meg	0Ω	†1Meg	270Ω	†245KΩ
V 2	6SC7	0Ω	†100KΩ	120KΩ	470KΩ	†185KΩ	1KΩ	270Ω	270Ω
V 3	6SC7	47KΩ	†155KΩ	1.2KΩ	20KΩ	†155KΩ	1KΩ	270Ω	270Ω
V 4	6V6GT	INF	270Ω	†490Ω	†3.6KΩ	270KΩ	INF	270Ω	270Ω
V 5	6V6GT	INF	270Ω	†490Ω	†3.6KΩ	320KΩ	INF	270Ω	270Ω
V 6	5Y3GT	INF	50KΩ	INF	185Ω	†300Ω	175Ω	INF	50KΩ

† MEASURED FROM PIN 2 OF V6

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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PHOTOFACT* Folder

RETMA MEMBER

FADA MODELS V271T, V273T, 24C4, 24C5

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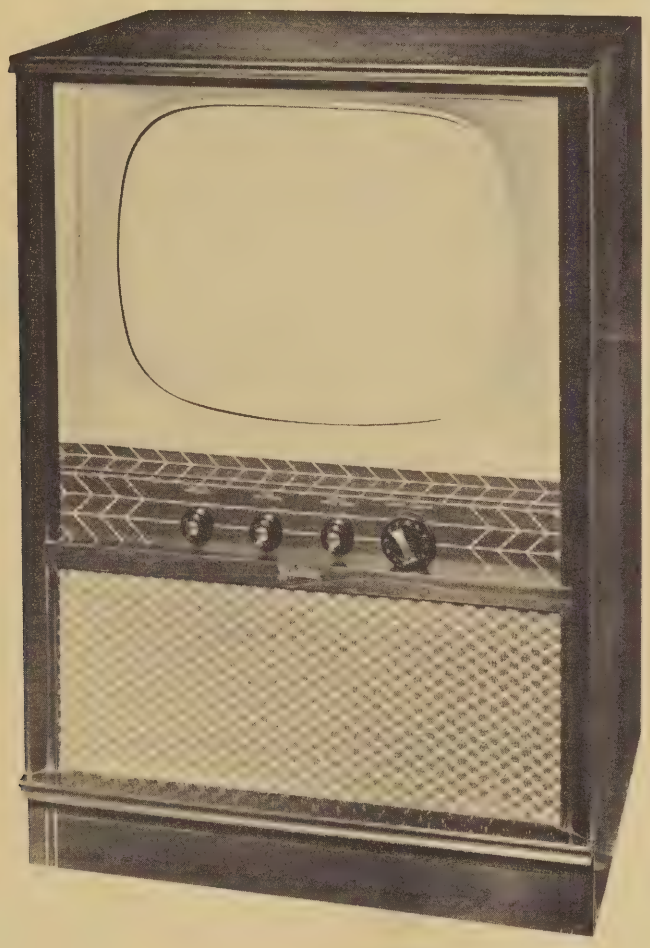

MODEL 24C5

FADA MODELS V271T, V273T, 24C4, 24C5

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DATE 12-54 SET 259 FOLDER 5

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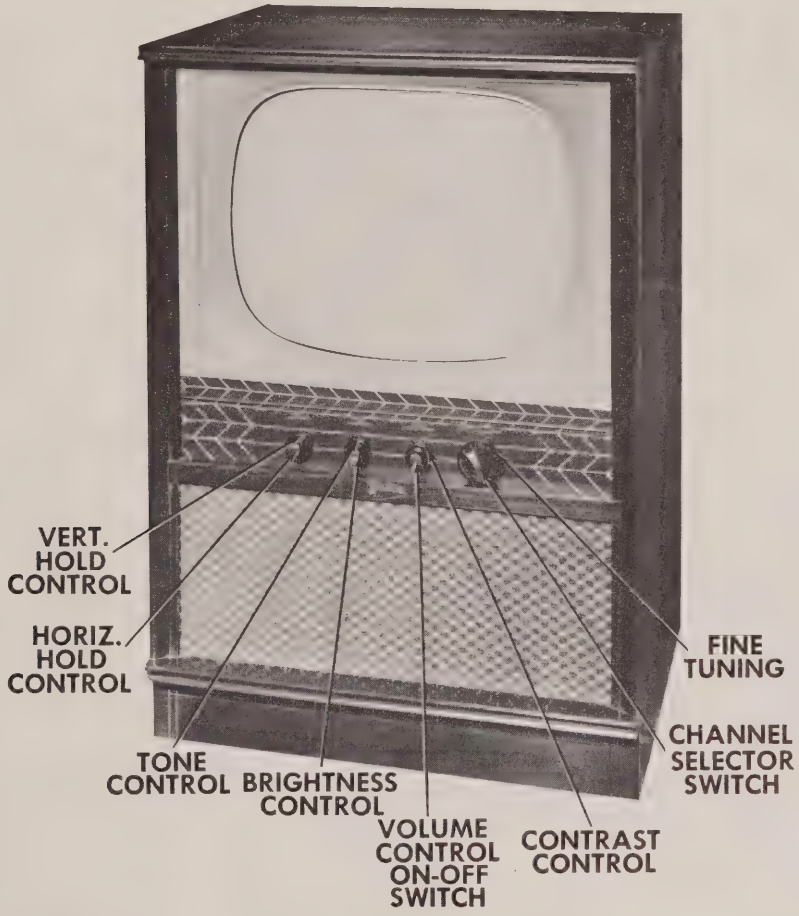

FADA MODEL 24C5

TRADE NAME	Fada Models V271T, V273T, 24C4, 24C5
MANUFACTURER	Fada Radio & Electric Co., Inc., 525 Main St., Belleville, N.J.
TYPE SET	Television Receiver
TUBES	Twenty-two
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING 2.46 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.1MC, Sound IF 21.6MC (Intercarrier)

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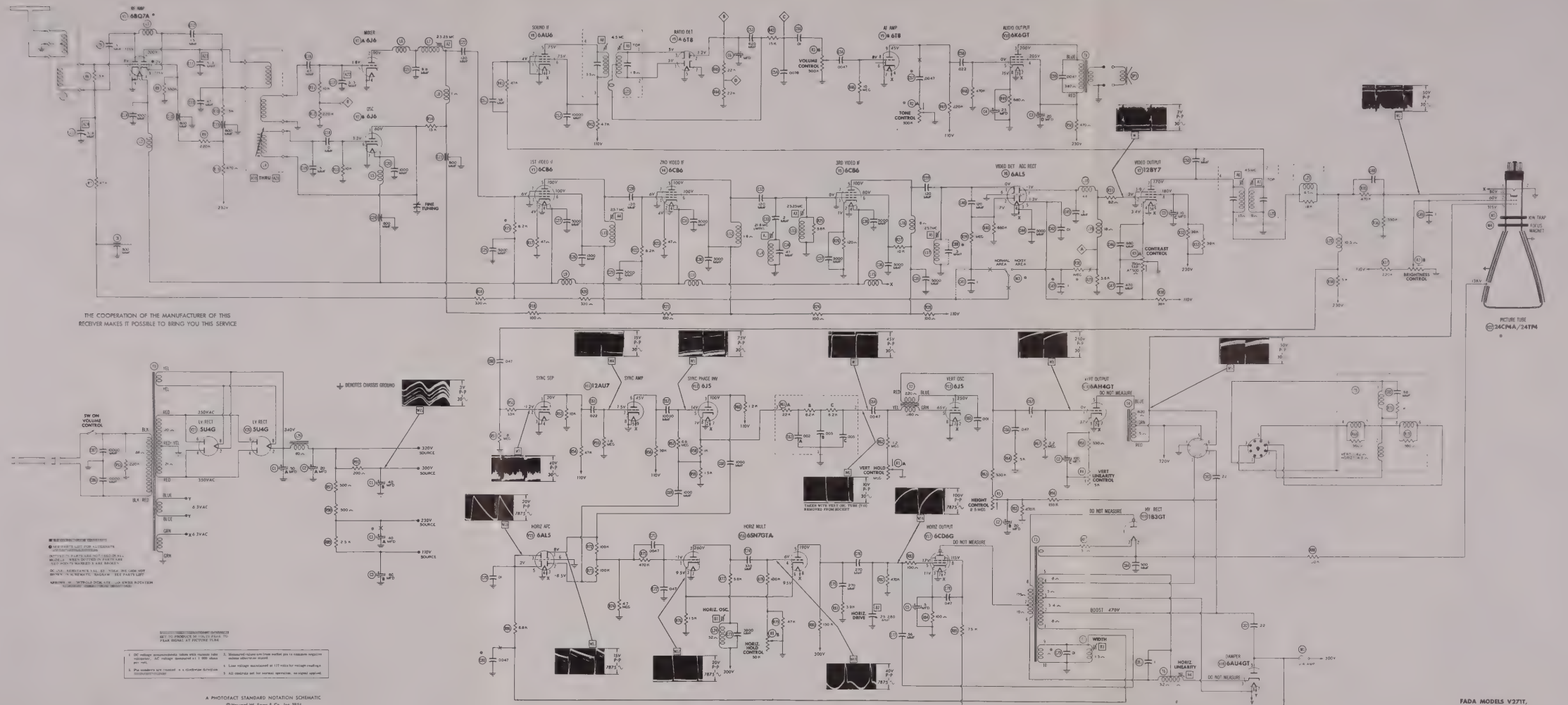

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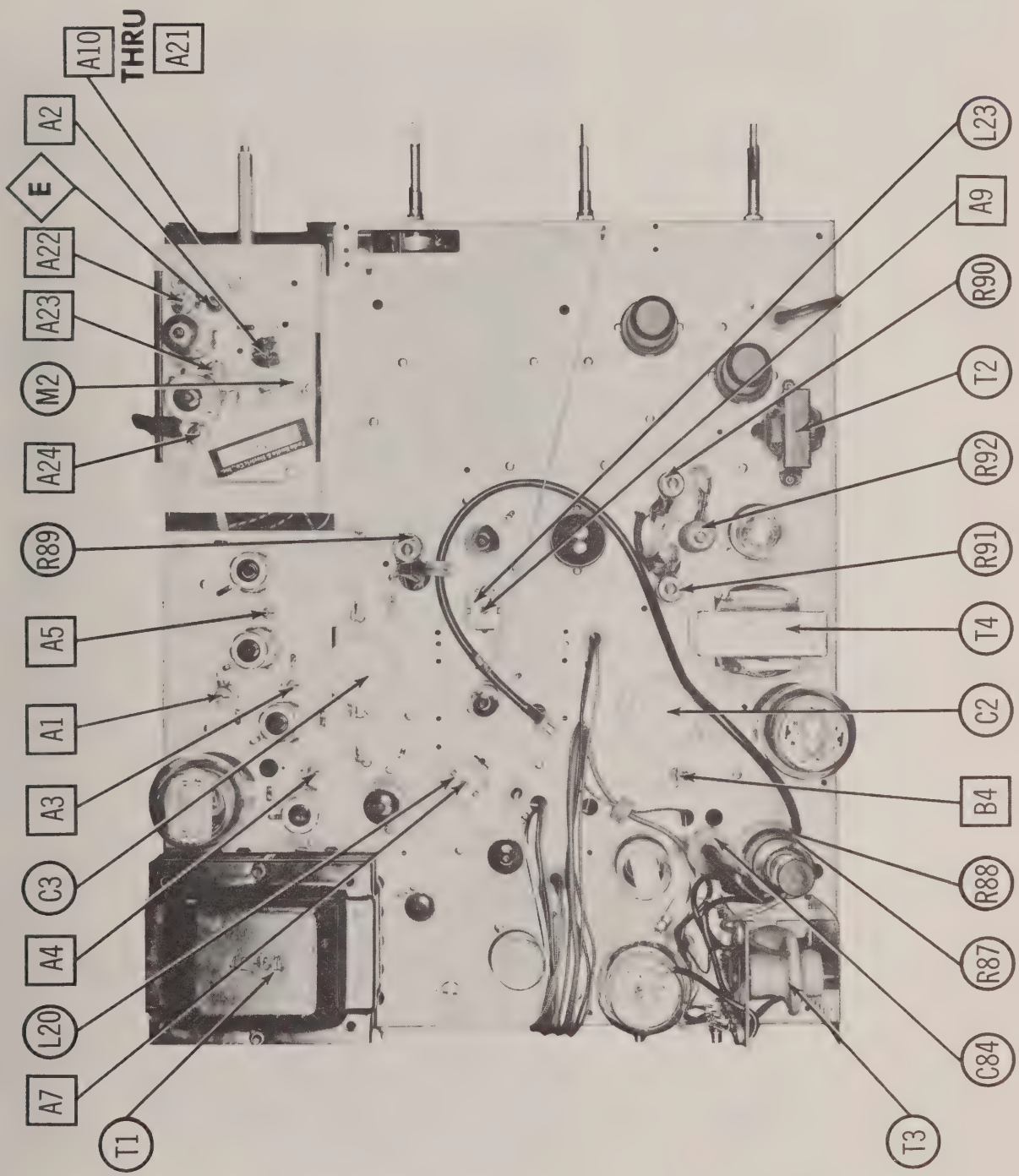
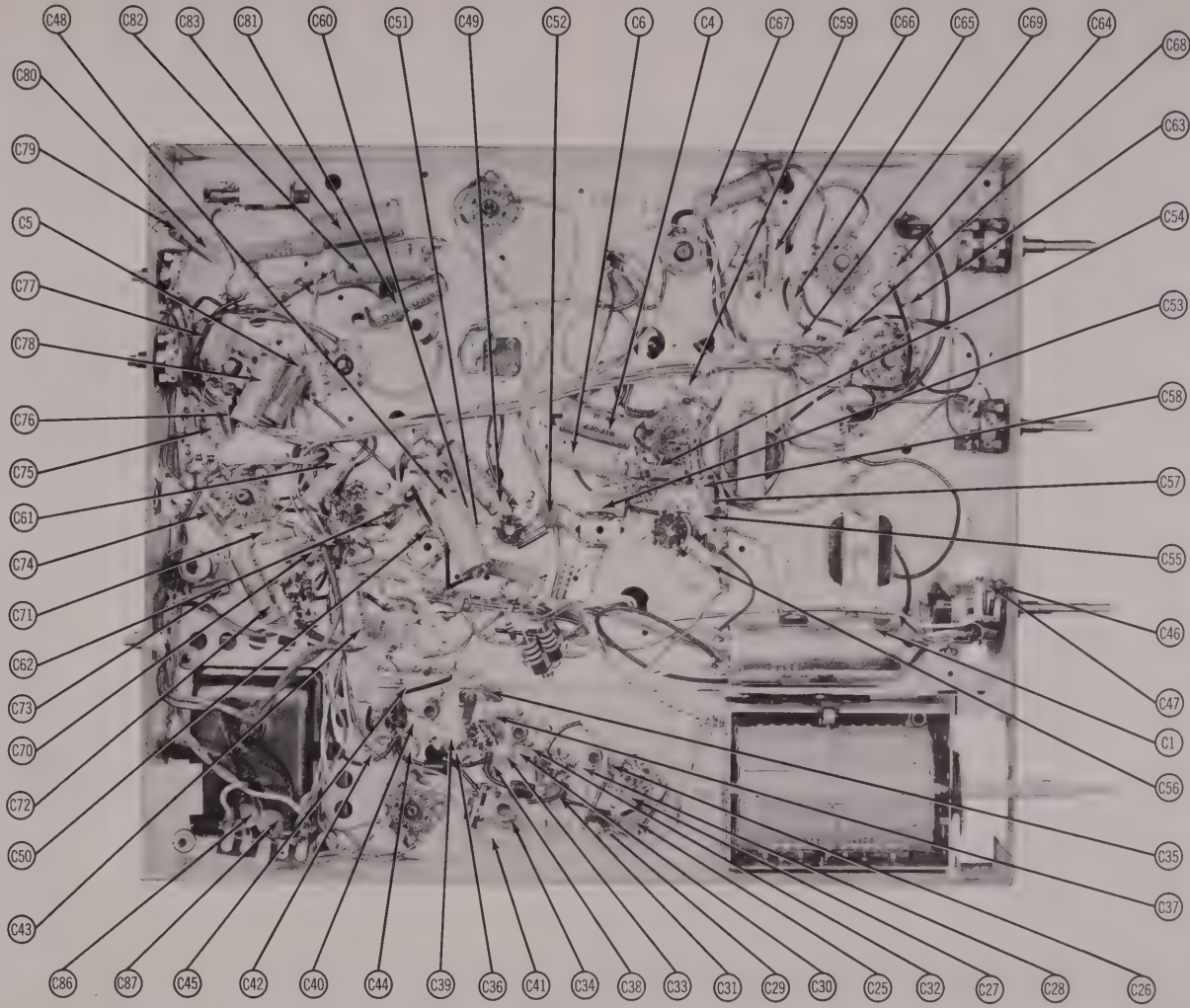


FADA
MODELS V271T, V273T, 24C4, 24C5
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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TUBE PLACEMENT CHART

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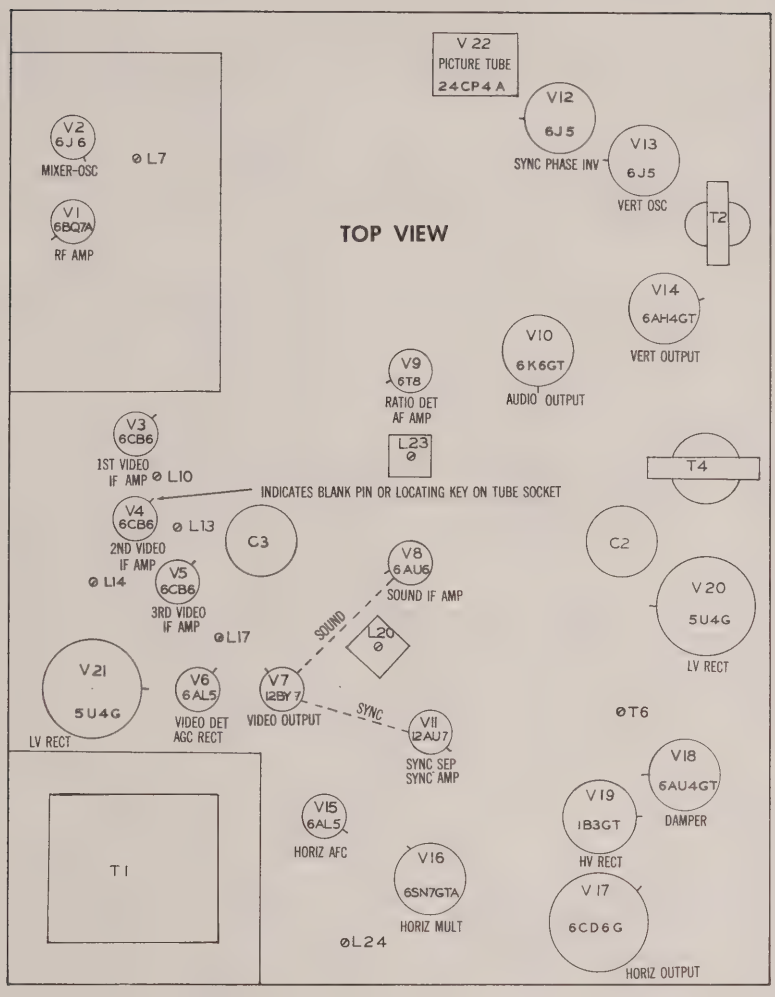

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V20, V21**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V7**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V22**
Has pic, no sound - **V8, V9, V10**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V12, V15, V16**
No vert. or horiz. sync - **V11, V12**

SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V22, Fuse (M1)**
No vertical deflection - **V13, V14**
Poor vert. linearity or foldover - **V13, V14**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, V20, V21**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V12, V15, V16**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V16) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 4.5 volt bias battery to the junction of R20, R22 and C29. Disconnect the white wire to the center terminal of the AGC switch at the junction of R20, R22 and C29.
Set the contrast control to MINIMUM contrast position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	21.6MC (Unmod)	Any	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	23.25MC (Unmod)	"	"	A2, A3	Adjust for maximum deflection. Attenuate generator output to maintain approximately 2.5 volts at VTVM.
3.	"	"	25.7 MC (Unmod)	"	"	A4, A5	"

OVERALL VIDEO IF RESPONSE CHECK

Use only enough sweep generator output to produce usable indication on scope. If a sweep generator of below average output is used reduce the bias from -4.5 volts to -3 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.6MC 22.7MC 26.1MC	Any	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch A2 thru A5 to obtain desired response. Use high scope gain to view 21.6MC marker. Adjust A1 for minimum marker amplitude.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 2 (grid) of 12BY7 (V7). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A6, A7, A8	Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point Ⓒ. Common to point Ⓓ.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
7.	"	"	"	"	DC probe thru detector (Fig. 5) to pin 11 (cathode) of picture tube.	A6	Turn the contrast control fully clockwise. Adjust for MINIMUM deflection. Reset contrast control to minimum contrast position.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 2 (grid) of 12BY7 (V7). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A6, A7, A8	Disconnect stabilizing capacitor C6. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
6.	"	"	"	"	"	Veft. Amp. to point Ⓒ. Low side to chassis.	A9	Reconnect stabilizing capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.
7.	"	"	Not used	4.5MC (400%Mod)	"	Vert. Amp. thru detector (Fig. 5) to pin 11 (cathode) of picture tube.	A6	Turn contrast control fully clockwise. Adjust for MINIMUM 400% indication on scope. Reset contrast control to minimum contrast position.

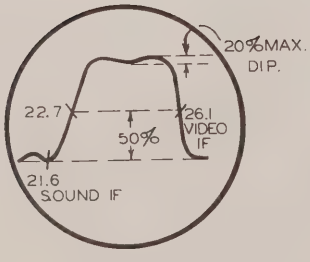

FIG. 1

FIG. 2

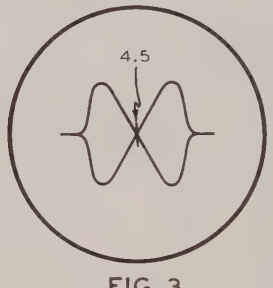

FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

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OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Leave the bias connected as under "Video IF Alignment ", but use -3 volts instead of -4.5 volts.
The channel oscillator adjustment screws are reached thru a hole just to the right of the channel switch shaft. The correct oscillator adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A10	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%.
			213MC (10MC Swp)	211.25MC 215.75MC	13		A11	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A12	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A13	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A14	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A15	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A16	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A17	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A18	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A19	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A20	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A21	

RF AND MIXER ALIGNMENT

Leave the bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A22, A23, A24	Adjust for response similar to Fig. 6 with markers above 90%.
10.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 6. If markers fall below 70% on any channel make compromise adjustments of A22, A23 and A24 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected. Remove the bias supply and restore connection from center terminal of AGC switch (white wire) to junction of R20, R22 and C29.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

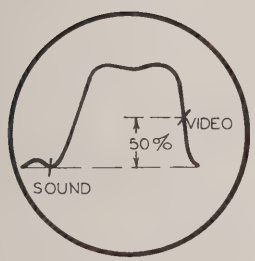


FIG. 4

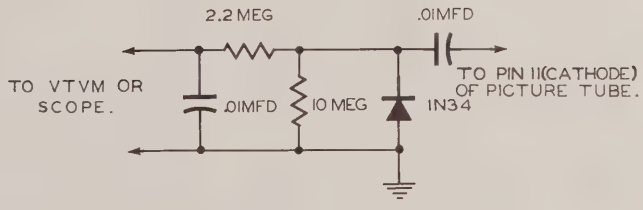


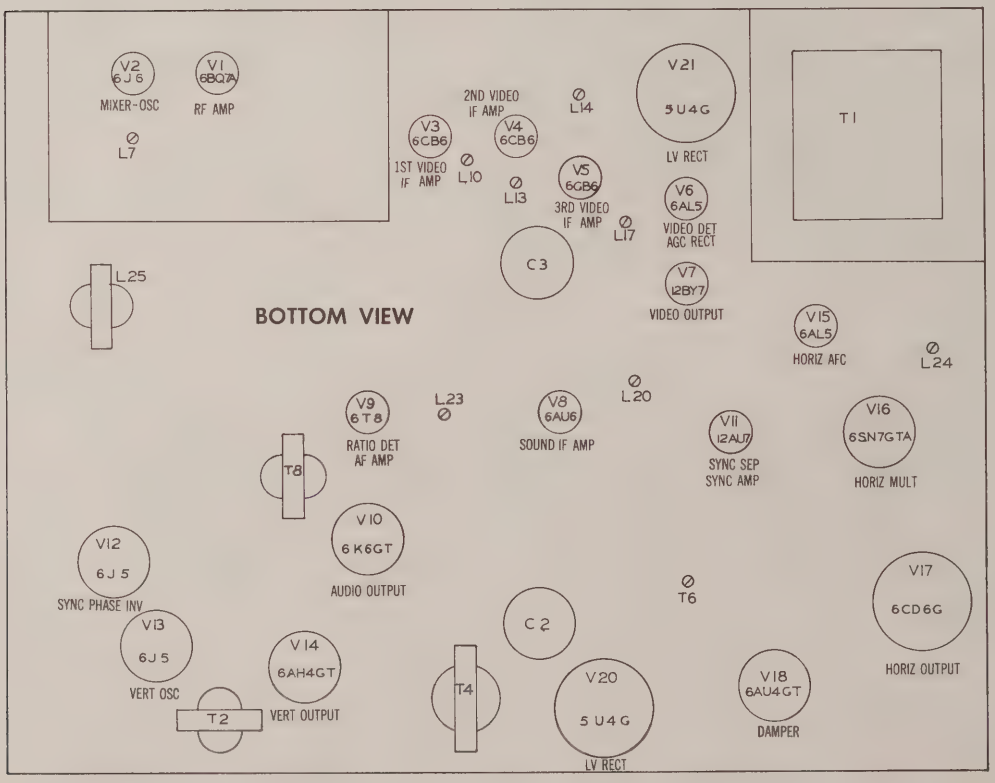
FIG. 5

FIG. 6

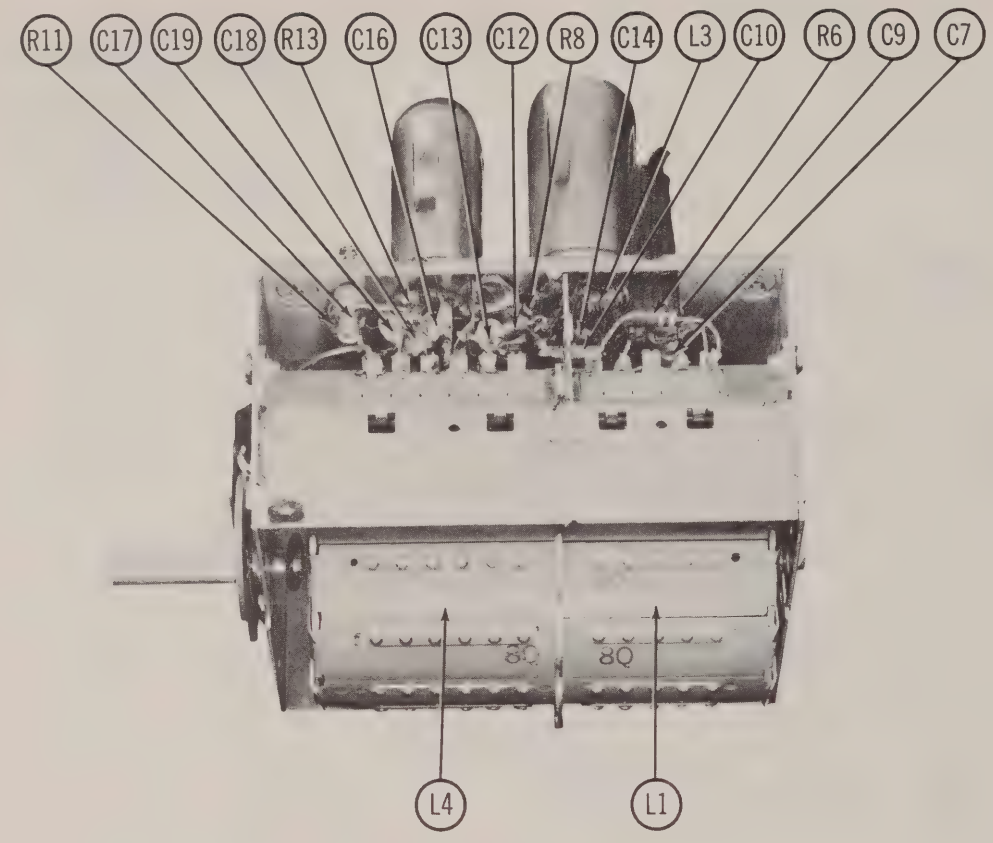
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ 7A	INF	▲2Meg	0Ω	.1Ω	0Ω	†3. 2KΩ	150KΩ	INF	0Ω
V 2	6J6	†18KΩ	†3KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	▲1. 7Meg	47Ω	.1Ω	0Ω	†3. 3KΩ	†3. 3KΩ	0Ω		
V 4	6CB6	▲1. 7Meg	47Ω	.1Ω	0Ω	†3. 3KΩ	†3. 3KΩ	0Ω		
V 5	6CB6	.2Ω	120Ω	.1Ω	0Ω	†3. 3KΩ	†13KΩ	0Ω		
V 6	6AL5	.2Ω	680KΩ	.1Ω	0Ω	600Ω	0Ω	5. 6KΩ		
V 7	12BY7	300Ω	5. 6KΩ	0Ω	0Ω	0Ω	.1Ω	†5. 5KΩ	†20KΩ	0Ω
V 8	6AU6	47KΩ	0Ω	.1Ω	0Ω	†7. 7KΩ	†7. 7KΩ	0Ω		
V 9	6T8	INF	44KΩ	INF	.1Ω	0Ω	INF	0Ω	10Meg	†220KΩ
V 10	6K6GT	INF	.1Ω	†1. 8KΩ	†1. 5KΩ	470KΩ	470KΩ	0Ω	680Ω	
V 11	12AU7	†25KΩ	1. 8Meg	0Ω	0Ω	0Ω	†42KΩ	1. 8Meg	0Ω	.1Ω
V 12	6J5	0Ω	0Ω	†4. 2KΩ	INF	6. 8Meg	INF	.1Ω	2. 5KΩ	
V 13	6J5	0Ω	.1Ω	◓500KΩ	INF	2Meg	INF	0Ω	0Ω	
V 14	6AH4GT	2. 2Meg	0Ω	INF	INF	†1. 7KΩ	INF	.1Ω	2. 5KΩ	
V 15	6AL5	4. 8Meg	4. 8Meg	.1Ω	0Ω	6. 8KΩ	0Ω	6. 8KΩ		
V 16	6SN7GTA	5. 2Meg	†5. 9KΩ	1. 5KΩ	110KΩ	†150KΩ	1. 5KΩ	0Ω	.1Ω	
V 17	6CD6G	INF	.1Ω	100Ω	470KΩ	470KΩ	INF	0Ω	†17. 5KΩ	Top Cap ◓14Ω
V 18	6AU4GT	INF	INF	350KΩ	INF	†265Ω	†265Ω	350KΩ	350KΩ	
V 19	1B3GT	PIN 1-8 HAVE INF RESISTANCE								Top Cap ◓190Ω
V 20	5U4G	INF	20KΩ	INF	20Ω	INF	21Ω	INF	20KΩ	
V 21	5U4G	INF	20KΩ	INF	21Ω	INF	20Ω	INF	20KΩ	
V 22	24CP4A	.1Ω	†25KΩ	Pin 10 †70Ω	Pin 11 †200KΩ	Pin 12 0Ω				

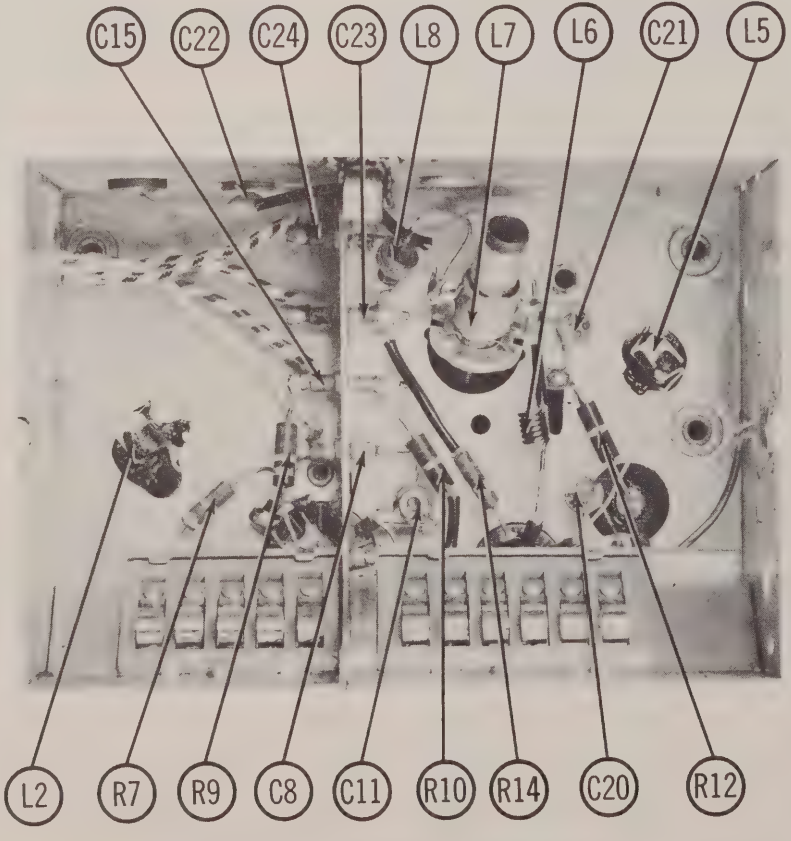
▲ MEASURED WITH AGC SWITCH IN "NORMAL AREA" POSITION.
◓ MEASURED FROM PIN 3 OF V18.
† MEASURED FROM PIN 2 OF V20.



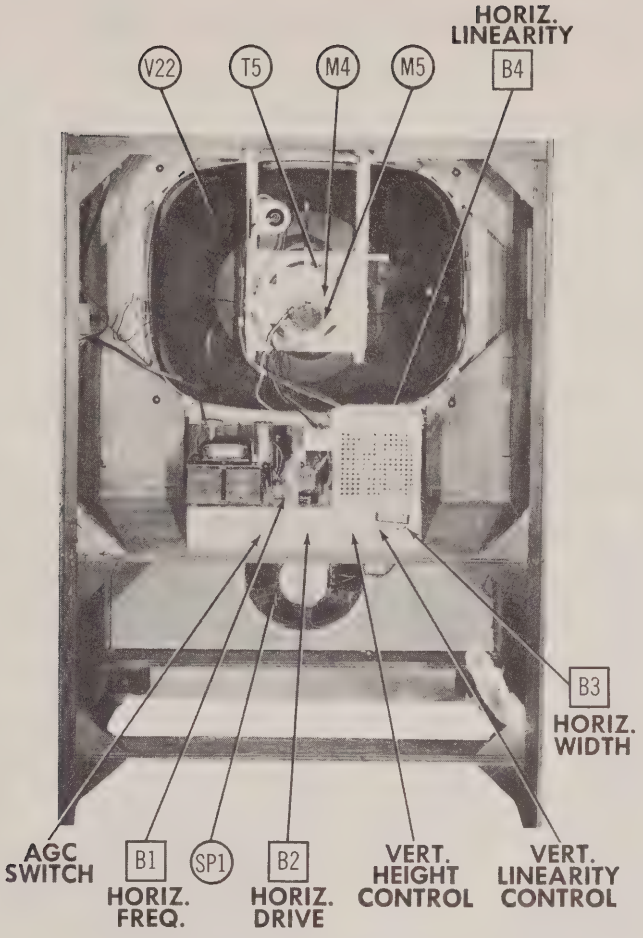
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



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CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B3) for a picture that is slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

AGC CONTROL ADJUSTMENT

In normal or strong signal areas turn the AGC control to its fully clockwise position. In weak or noisy signal areas the control should be turned fully counter clockwise.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check adjustments B2, B3 and B4. Check by substitution V17, V18, V20 and V21. Check R85, R84, C5, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V17 and V18. Check adjustments B2 and B4. Check R85 and other associated components. Check T3 and T5A.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V16, V17 and V18. Check C72 for open. Check L24, C73, C74, C71 and other associated components.

XMAS TREE EFFECT

Check by substitution V16, V17 and V18. Check T3 and T5A for internal arcing. Check C73, C74, C76, C75, L24, R76, R77, R80 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V13 and V14. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T4, T5B, C2C, R68, R4 and other associated components.	Check T2, C65, C67, R66, R63, R5 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check height and vertical linearity controls for proper operation. Check T4, T5B, C2B and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V13 and V14. Check T4, T5B, R5, R63, T2 and other associated components.

COMPRESSED AT TOP

Check by substitution V13 and V14. Check C2C, R4, R68 and other associated components.

FOLDS

Check by substitution V13 and V14. Check C66, R64, R68, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V11 and V12. Check C62, C61, C60, R54, R56, R60 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V13. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T2, R62, R1A, R63 and other associated components.	Check vertical integrator network for component failure or change of value. Check video IF for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check C68, C69, C71, R72, R73 and other associated components.

HORIZONTAL BENDING

Check by substitution V11, V12, V15, and V16. Check horizontal AFC network. Check components associated with V16.

VIDEO

LOSS OF VIDEO

Substitute V7. Check L21, L22, C48, C3C, R34, R32, R33 and other associated components.

SOUND BARS (4.5 MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Substitute V7. Check video detector network. Check contrast control and picture tube. Check video IF alignment.

NEGATIVE PICTURE

Substitute V7. Check video detector network. Check picture tube. Check C48, L21 and other associated components.

SMEAR

Substitute V7. Check L18, L19, L21, L22, C48, R35 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stages V9B and V10 using audio signal generator. Apply audio signal across R3B.

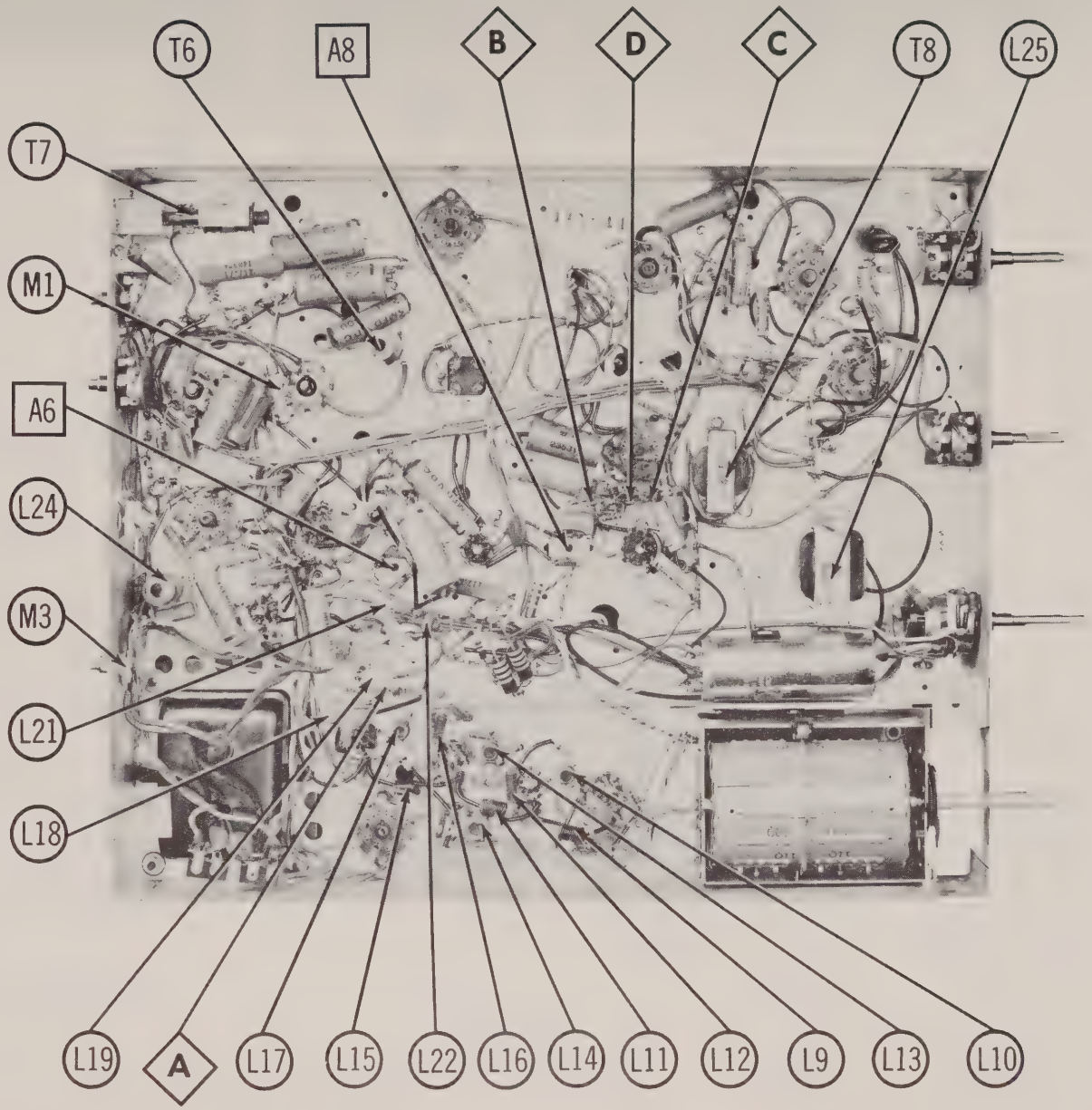
If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF for component failure or change of value.	Check C55, C56, C58, C59, R50, R47, T8, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A9 for minimun buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

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DENVER, COLORADO

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: FADA Part No	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	5BK7 or 5BQ7 used in some sets
V2	Mixer - Osc.	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector - AGC Rectifier	6AL5	6AL5	6BT	
V7	Video Output	12BY7	12BY7	9BF	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V10	Audio Output	6K8GT	6K8GT	7S	
V11	Sync Separator - Sync Amplifier	12AU7	12AU7	9A	
V12	Sync Phase Inv.	6J5	6J5	6Q	
V13	Vert. Oscillator	6J5	6J5	6Q	
V14	Vert. Output	6AH4GT	6AH4GT	8EL	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V17	Horiz. Output	6CD6G	6CD6G	5BT	
V18	Damper	6AU4GT	6AU4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: FADA Part No	CBS HYTRON Part No.	GENERAL ELECTRIC Part No.	SYLVANIA Part No.	WESTINGHOUSE Part No.	RETMA BASE TYPE	NOTES
V22	24CP4A or 24TP4 21EP4	24CP4A or 24TP4 21EP4	24CP4A	24CP4A or 24CP4 27EP4		12N 12N 12D 12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: FADA Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C1A	.50	475	22.79	AFH3-54		C941		FP396	TVL-3843	
B	.40	475								
C2A	.20	450	22.81	AFH4-80		D083		FP437	TVL-4740	
B	.20	450								
C	.00	50								Note 1
D	.20	450								
C3A	.40	450	22.90	AFH4-17		D115		FP385.1	TVL-3727	Note 2
B	.40	350		PHS450-80				TC75	TVA-1712	
C	.40	350								
D	.20	450								
C4	25	50	22.86	PRS50/25		BR255		TC36	TVA-1306	
C5	5	50	22.86	PRS150/4		BR154		TC30	TVA-1302	
C6	.1	150	22.70	PRS10/4		BR145		TC40	TVA-1402	
C7	3-9				829-10					
C8	800			EF-001	MFT-1000				503C-D1	
C9	3			S1NP0	TCZ-3	Z007	NP0K-030	ZT-5533	5TCCB-V33	
C10	800			EF-001	MFT-1000				503C-D1	
C11	5-3				829-3		3115-01-0R5	CT565A		
C12	1.5			5L.5NP0	TCZ-1.5	Z004	NP0K-1R5	ZT-5515	5TCCB-V15	
C13	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C14	1000			BPD-001	D6-102		801-001	DC-521	5HK-D1	
C15	800			EF-001	MFT-1000				503C-D1	
C16	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C17	5-3				829-3		3115-01-0R5	CT565A		
C18	10			S1ON0P0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C19	5									
C20	1000			BPD-001	DD-102	K080	801-001	DC-521	5HK-D1	
C21	6.8			S1N.68NP0	TCZ-6.8	Z015	NP0K-6R8	ZT-5588	5TCCB-V68	
C22	120			BPD-00012	D6-121	G044	GP2K-121	UC-5321	5GA-T12	
C23	800			EF-001	MFT-1000				503C-D1	
C24	800			EF-001	MFT-1000				503C-D1	
C25	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C26	1500		17.45	S1I500	D6-152	TP54	GP1L-152	UC-5215	5HK-D15	
C27	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C28	120		17.106	S1I20	D6-121	TP53	GP2K-121	UC-5313	5GA-T12	
C29	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C30	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C31	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C32	120		17.106	S1I20	D6-121	TP53	GP2K-121	UC-5312	5GA-T12	
C33	2		17.127	S1I2.2NP0	TCZ-2.2	Z005	NP0K-2R2		5TCCB-V22	
C34	47		17.130	S1N1NP0	TCZ-47	Z033	NP0K-470	ZT-5447	5TCC-Q47	
C35	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C36	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C37	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C38	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C39	120		17.106	S1I20	D6-121	TP53	GP2K-121	UC-5312	5GA-T12	
C40	120		17.106	S1I20	D6-121	TP53	GP2K-121	UC-5312	5GA-T12	
C41	.1	200	12.49	P288-1	DF-104	CUB21P1		PT401	2TM-P1	
C42	.01	400	12.78	P488-01	D6-103	CUB4B1	GP2-333-103	PT411	4TM-S1	
C43	.1	200	12.49	P288-1	DF-104	CUB21P1		PT401	2TM-P1	Note 3
C44	5000		17.44	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C45	5		17.79	S1N	D6-050	TP06	GP1K-050	DC-5105	5GA-V5	
C46	680		17.108	S1680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C47	470		17.107	S1470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C48	.1	600	12.80	P688-1	DF-104	CUB21P1		PT601	6TM-P1	
C49	.1	400	12.75	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C50	2		17.59	S12.2NP0	TCZ-2.2	Z005	NP0K-2R2		5TCCB-V22	
C51	39		17.105	S139	D6-390	TP28	GP1K-390	UC-5459	5GA-Q39	
C52	10000		17.80	BPD-01	DD-103	K082	81L-01	DC-511	5HK-B1	
C53	820	500	17.125	1464-821		SR5T82				
C54	.0039	600	12.71	P688-004	D6-392	CUB6D4	GP2-333-392	PT624	6TM-D4	
C55	.01	400	12.78	P488-01	D6-103	CUB4B1	GP2-333-103	PT411	4TM-S1	

CAPACITORS (cont)

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: FADA Part No	AEROVOX Part No	CENTRALAB Part No	CORNELL DUBILIER Part No.	ERIE Part No	MALLORY Part No	SPRAGUE Part No	NOTES
C56	.0047	400	12.68	P688-0047	D6-472	CUB6D47	GP2-333-472	PT647	6TM-D47	
C57	.0047	400	12.68	P688-0047	D6-472	CUB6D47	GP2-333-472	PT647	6TM-D47	Note 3
C58	.022	400	12.82	P488-022	DF-203	CUB4E1	81T-02	PT4122	4TM-S22	
C59	.0047	400	12.68	P688-0047	D6-472	CUB6D47	GP2-333-472	PT647	6TM-D47	
C60	.047	400	12.87	P488-047	DF-503	CUB4B47		PT4147	4TM-S47	
C61	.022	400	12.82	P488-022	DF-203	CUB4E22	81T-02	PT4122	4TM-S22	
C62	10000		17.80	BPD-01	DD-103	K082	81L-01	DC-511	5HK-B1	
C63A	.005							PT623		
B	.005		s187.1	sPA-N10	sPC-100	slB5TM1	el405-01	PT635	sV-1	
C	.005							PT625		
C64	.0047	500	12.83	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C65	.001	1000	12.120							
C66	.047	400	12.87	P488-047	DF-503	CUB4B47		PT4147	4TM-S47	
C67	.1	400	12.75	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C68	1000		17.109	S1I000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C69	1000		17.109	S1I000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C70	.01	400	12.78	P488-01	D6-103	CUB4S1	GP2-333-103	PT611	6TM-S1	
C71	.0047	400	12.68	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C72	.047	400	12.87	P488-047	DF-503	CUB4B47		PT4147	4TM-S47	
C73	3900	500	17.133	1464-392		1R5D39		MCB483	MS-24	
C74	330	500	17.69	1469-331		5R5T33				
C75	270	500	17.123	1469-271		22R5T27		MCB241	MS-23	
C76	270	500	17.123	1469-271		22R5T27		MCB241	MS-23	
C77	56	1000	17.138							
C78	.047	600	12.86	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C79	.01	400	12.72	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	Note 4
C80	.0047	600	12.88	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	Note 4
C81	.1	400	12.75	P488-1		CUB4P1		PT401	4TM-P1	
C82	.22	400	12.77	P488-22		CUB4P22		PT4022	4TM-P22	
C83	.22	600	12.77	P488-22		CUB6P22		PT6022	6TM-P22	
C84	500	20000	17.116	HV20C	TV3-502	MMU20T5	413	HV20035A	20DK-T5	
C85	68	1500	17.143	HVD15-680	DD30-680	MCQ68	HSKV-680		20GA-Q68	
C86	10000		17.136	BPD-01	DD-103	K082	81L-01	DC-511	5HK-B1	
C87	10000		17.136	BPD-01	DD-103	K082	81L-01	DC-511	5HK-B1	
C88	3		17.131							Note 5

Note 1. C2D is not used.
Note 2. In some versions, C3A is omitted, C3 is replaced by a 3 section unit part #22.80.
Note 3. Not used in models V27ST and 24C4.
Note 4. When C79 is .01MFD (part #12.79) C80 is not used.
Note 5. Not used in all versions.
* Items C63A, C63B, C63C, R61A, R61B, R61C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: FADA Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	1 Meg	½	52.05	* Q7-185	RTV-110	SBB-110	UF16L	Vert. Hold-Panel
B	50K Ω	½					UR54L	Horiz. Hold-Rear
R2A	500K Ω	½	52.70	■ Q7-435	RTV-401	F1-41	UP55A	Tone Panel-Note
B	50K Ω	½				R3-29	UR54L	Brightness-Rear
R3A	750Ω	2	52.64	♦ Q7-270	RTV-109		W975L - T25L	Contrast tapped @ 500 Ω panel-wire wound
B	500Ω	2						Volume-Rear
C	9 meg	½					UB-28	Attach to R3B
R4A	5000Ω	2	52.85	WK-5000	A43-5000	VK-155	R5000L	Vert. Linearity-wire wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A
R5A	2.5Meg	½	52.24	Q11-259	A47-2.5Meg	AB-45	SU-565	Weight
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A

* CONCENTRIKIT EQUIVALENT KIT K-7 BASE ELEMENTS & SHAFTS B11-137 & P1-126 (Panel)
B11-123 & P1-126 (Rear).
■ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS B13-133 & P1-126 (Panel)
B11-123 & R1-213 (Rear).
♦ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS W1-105X & P4-124 (Panel)
B13-133 & R1-212 (Rear) & SWITCH 78-L.
† Universal replacement (Mallory exact duplicate Part No. UR16G).
†† Universal replacement (Mallory exact duplicate Part No. UE124S).
ŧ Universal replacement (Mallory exact duplicate Part No. UE12WS).
Note: Not used in models V27ST & 24C4.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: FADA Part No.	IRC Part No.	NOTES
R6	15KΩ	½		BTS-15K	
R7	47KΩ	½		BTS-47K	
R8	330KΩ	½		BTS-330K	
R9	220KΩ	½		BTS-220K	
R10	1500Ω	½		BTS-1500	
R11	10KΩ	½		BTS-10K	
R12	220KΩ	½		BTS-220K	
R13	10KΩ	½		BTS-10K	
R14	15KΩ	½		BTS-15K	
R15	8200Ω	½		BTS-8200	Note 1
R16	330Ω	½	32.67	BTS-330	
R17	47Ω	½	32.107	BTS-47	
R18	100Ω	½	32.2	BTS-100	
R19	470Ω	½	32.173	BTS-470	
R20	330Ω	½	32.67	BTS-330	
R21	100Ω	½	32.2	BTS-100	
R22	8200Ω	½	32.77	BTS-8200	
R23	47Ω	½	32.107	BTS-47	
R24	100Ω	½	32.2	BTS-100	
R25	5800Ω	½	32.126	BTS-5800	
R26	1200Ω	½	32.118	BTS-1200	
R27	10KΩ	½	32.11	BTS-10K	
R28	100Ω	½	32.2	BTS-100	
R29	5800Ω	½	32.126	BTS-5800	
R30	1Meg	½	32.33	BTS-1Meg	Note 2
R31	82Ω	½	32.125	BTS-82	
R32	39KΩ	2	32.660	BTB-39K	
R33	39KΩ	2	32.680	BTB-39K	
R34	5000Ω	10	117.80	PW10-5000	
R35	470KΩ	½	32.92	BTS-470K	
R36	330KΩ	½	32.205	BTS-330K	
R37	22KΩ	½	32.183	BTS-22K	
R38	39KΩ	1	33.108	BTA-39K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: FADA Part No.	IRC Part No.	NOTES
R39	1Meg	½	32.33	BTS-1Meg	
R40	680KΩ	½	32.95	BTS-680K	
R41	47KΩ	½	32.15	BTS-47K	
R42	470Ω	1	32.74	BTA-470	
R43	15KΩ	½	32.12	BTS-15K	
R44	22KΩ	½	32.13	BTS-22K	
R45	22KΩ	½	32.13	BTS-22K	
R46	10Meg	½	32.99	BTS 10Meg	
R47	220KΩ	½	32.18	BTS-220K	
R48	470KΩ	½	32.92	BTS-470K	
R49	680Ω	1	32.115	BTA-680	
R50	470Ω	1	32.259	BTA-470	
R51	1.8Meg	½	32.208	BTS-1.8Meg	
R52	33KΩ	½	32.14	BTS-33K	
R53	10KΩ	½	32.11	BTS-10K	
R54	47KΩ	½	32.15	BTS-47K	
R55	1.8Meg	½	32.208	BTS-1.8Meg	
R56	39KΩ	½	32.680	BTA-39K	
R57	6.8Meg	½	32.46	BTS-6.8Meg	
R58	10000Ω	½	32.8	BTS-10000	
R59	1500Ω 5%	½	32.117	BTS-1500 5%	
R60	1200Ω 5%	½	32.89	BTS-1200 5%	
R61A	22KΩ	½		BTS-22K	
B	8200Ω	½	s187.1	BTS-8200	
C	8200Ω	½		BTS-8200	
C62	1.2Meg	½		BTS-1.2Meg	
R63	330KΩ	½	32.205	BTS-330K	
R64	15KΩ	½	32.12	BTS-15K	
R65	470KΩ	½	32.92	BTS-470K	
R66	150KΩ	½	32.90	BTS-150K	
R67	2.2Meg	½	32.24	BTS-2.2Meg	
R68	330Ω	½	32.67	BTS-330	
R69	560Ω	½	32.68	BTS-560	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: FADA Part No.	IRC Part No.	NOTES
R70	560Ω	½	32.68	BTS-560	
R71	1000Ω	½	32.8	BTS-1000	
R72	100KΩ	½	32.89	BTS-100K	
R73	100KΩ	½	32.89	BTS-100K	
R74	4.7Meg	½	32.98	BTS-4.7Meg	
R75	470KΩ	½	32.92	BTS-470K	
R76	1500Ω 5%	½	32.265	BTS-1500 5%	
R77	560Ω	½	32.126	BTS-560	
R78	100KΩ	½	33.89	BTS-100K	
R79	47KΩ	½	33.15	BTS-47K	
R80	150KΩ	½	32.90	BTS-150K	
R81	39000Ω 5%	½	32.202	BTS-3900 5%	

* Items R61A, R61B, R61C, C63A, C63B, C63C are combined in one unit.

ITEM No	RATING: OHMS	WATT	REPLACEMENT DATA: FADA Part No	IRC Part No	NOTES
R82	470KΩ	½	33.92	BTS-470K	
R83	10 Ω	½	32.2	BTB-100	
R84	100Ω	5	117.94	PW5-100	
R85	17,500	10	117.71	13.4A-17,500	
R86	68000Ω 5%	1	32.10	BTS-6800 5%	
R87	5.1Ω	½	32.137		
R88	100KΩ	1	32.373	BTA-100K	
R89	2500Ω	25	117.83		
R90	500Ω	20	117.74	2D-500	
R91	500Ω	20	117.74	2D-500	
R92	200Ω	20	117.86	2D-200	
R93	220KΩ	1		BTA-220K	

Note 1 Some versions may use a 10KΩ resistor in this application.
Note 2 Not used in Models V27ST and 24C4.

TRANSFORMER (POWER)

ITEM No	RATING: PRI	SEC 1	SEC 2	SEC 3	SEC 4	SEC 5	REPLACEMENT DATA: FADA Part No	Stancor Part No	Merit Part No	Triad Part No	RCA TYPE No	Hallicrafters Part No	Thordarson Part No
T1	117VAC @ 2.46A	700VCT @ .290ADC	5VAC @ 6A	6.3VAC @1.8A	6.3VAC @10A		42.61	P-8168 ① ②					

① Drill new mounting holes.
② Parallel and phase 6.3V @ 5A winding for Sec. #4.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: FADA Part No.	Stancor Part No.	Merit Part No.	Triad Part No.	RCA TYPE No.	Hallicrafters Part No.	Thordarson Part No.
T2	Vert. Osc. Trans.	42.53	A-81U	A-3000	A-95X	209T1	B6700	24A87
T3	Horiz. Output Trans.	37.280						
T4	Vert. Output Trans.	42.82	A-8141	A-3039	A-104X	222T1	Z1806	28S54
T5A	Yoke (90°) Horiz. (11.5MH)	37.381		MDF-90Q	V-50-1	213D8 ①		T-14
B	Vert. (40MH)							
T6	Horiz. Lin. Coil (1.2-5MH tapped)	37.244	WC-6 ③	MWC-5 ③		209R1		WC-17
T7	Width Coil (1.5-2.0MH)	37.248	WC-7	MWC-2 ③	WC-12 ③	209R1		WC-16 ④

① Use original yoke network.
③ Enlarge mounting hole.
④ Connect to ended green and red terminals.
Ⓐ Do not use tap.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	SEC	REPLACEMENT DATA: FADA Part No	Stancor Part No	Merit Part No	Triad Part No	Hallicrafters Part No	Thordarson Part No	NOTES
T8	6.5KΩ	3.3Ω	42.57	A-3877	A-3330	S-33X	Z1000	24S51	

SPEAKER

ITEM No	RATINGS: SIZE	FIELD	V	C	IMP	REPLACEMENT DATA: FADA Part No	VIKING Part No	QUAM Part No	NOTES
SP1	10"	PM	3.5Ω			107.58 107.53 ① 107.57 ①	10J11	10A31	① Speakers used in models V27IT and 27ST

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: FADA Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	Ant. Coils	0Ω						
L2	1st. Coils	0Ω						
L3	Mixer Coils	0Ω						
L4	Mixer, Osc. Coil	0Ω						
L5	1st. Video IF	0Ω						
L6	2nd. Video IF	0Ω						
L7	3rd. Video IF	0Ω						
L8	Video Det.	0Ω						
L9	1st. Video IF	0Ω		37.89	19-3001	TV-189	6175	.6 Microhenry
L10	2nd. Video IF	.2Ω		37.99	17-1003	TV-102 ■	6188 *	
L11	3rd. Video IF	0Ω		37.89	19-3001	TV-189	6175	.6 Microhenry
L12	RF Choke	1.6Ω		37.197	19-1005		4612	12 Microhenries
L13	3rd. Video IF	.2Ω		37.99	17-1004	TV-102 ■	6189	
L14	Sound Trap	0Ω		37.268	19-1021	TV-150	6171	
L15	Fil. Choke	0Ω		37.89	19-3001	TV-189	6175	.6 Microhenry
L16	RF Choke	1.6Ω		37.197	19-1005		4612	12 Microhenries
L17	4th. Video IF	.2Ω		37.99	17-1003	TV-102 ■	6188 *	
L18	Series Peaking Coil	4.6Ω		37.234	19-3125		6153	120 Microhenries
L19	Shunt Peaking Coil	1.8Ω		37.235	19-3680	TV-188	4630	600 Microhenries
L20	Sound IF	1.9Ω	1.9Ω	37.252	16-3445 ▲	TV-113	6203	
L21	Series Peaking Coil	6.5Ω		37.236	19-3180 ■	TV-184 ▲	6180 ▲	190 Microhenries -wound on 1 6kΩ resistor
L22	Shunt Peaking Coil	10.5Ω		37.237	19-3250	TV-185	6181	245 Microhenries
L23	Ratio Det.	5.5Ω	1.8KCT	37.253	17-3497	TV-115	6205	Tertiary winding - .6Ω
L24	Horiz. Osc.	52Ω		37.233	19-1576	TV-163	6210	

* Enlarge mounting hole.
■ Alternate part #TV-113
▲ Drill mounting holes.
● Parallel with 18KΩ resistor

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	FADA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L25	.290A	60Ω	1.5 Hy.	42.56	C-2326 ①	C-2996 ①	C-17X ①	C5037①	26C44①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FADA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG P/T	1/4A 250V			318.250 (1/4A-3AG-P/T)		GJV 1/4	

MISCELLANEOUS

ITEM No.	PART NAME	FADA PART No.	NOTES
M2	Tuner	B42.75	VHF
M3	Switch	47.30	AGC - not used in all models.
M4	Focus Magnet	112.38	Includes centering device
M5	Ion Trap	112.23	
B2	Trimmer Cap.	132.18	Horiz. Drive (25-280MMF)
	Cabinet	37.521	Models 24C5, 24C4
	Cabinet	A97.493	Models V271T, V273T
	Knob	142.94	Vert. Hold, tone, contrast - All Models
	Knob	142.93	Horiz. Hold - On/off-volume- All Models
	Knob	142.91	Channel Selector - Models 24C5, 24C4
	Knob	142.103	Channel Selector - Models V271T, V273T
	Knob	142.92	Fine tuning - Models 24C5, 24C4
	Knob	142.98	Fine tuning - Models V271T, V273T
	Knob	142.93	Brightness - Models 24C5, V271T
	Knob	142.95	Brightness - Models 24C4, V273T
	Mask	A97.523	Model 24C5
	Mask	97.523-1	Model 24C4
	Mask	97.499	Model V271T
	Mask	97.499-1	Model V273T
	Safety Glass	92.573	Models 24C5, 24C4
	Safety Glass	92.560	Models V271T, V273T

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check by substitution V20 and V21. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check by substitution V20 and V21. Check B+ filter and decoupling network.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check M1 fuse. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, C79, C82, C81 C78, C5, R85, R84 and other associated components.	Check L24, C73, C74, C76, R77 R80 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18, V19, V20 and V21. Check adjustments B2, B3 and B4. Check C76, C75, R85 and other associated components.

BLOOMING

Check by substitution V17, V18, V19, V20 and V21. Check R88, R84, C5 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V7. Check video IF and tuner components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona dischage and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at time, thru the small hole in the cabinet to the right of the channel selector shaft.

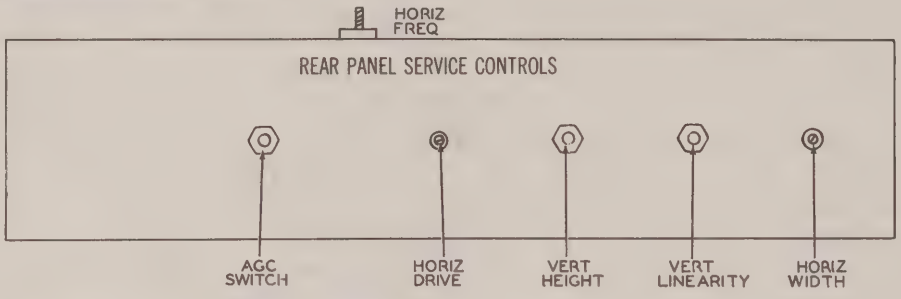
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 2 wood screws from each side molding. (Note: Hold glass in position when removing). Remove moldings ; glass will slide down and out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

Remove safety glass and mask, rear cover, picture tube socket, ion trap and HV lead. Loosen 2 front mounting band screws. Remove picture tube.

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (L24) until picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L23) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 8 push-on type control knobs from front panel.
2. Remove 9 wood screws. Remove rear cover.
3. Remove picture tube socket, HV lead and yoke socket.
4. Remove 2 wood screws. Remove antenna bracket.
5. Remove 1 metal screw from HV lead clamp.
6. Remove speaker leads . Remove 2 speaker bolts. Remove speaker.
7. Remove 4 chassis bolts. Remove chassis.

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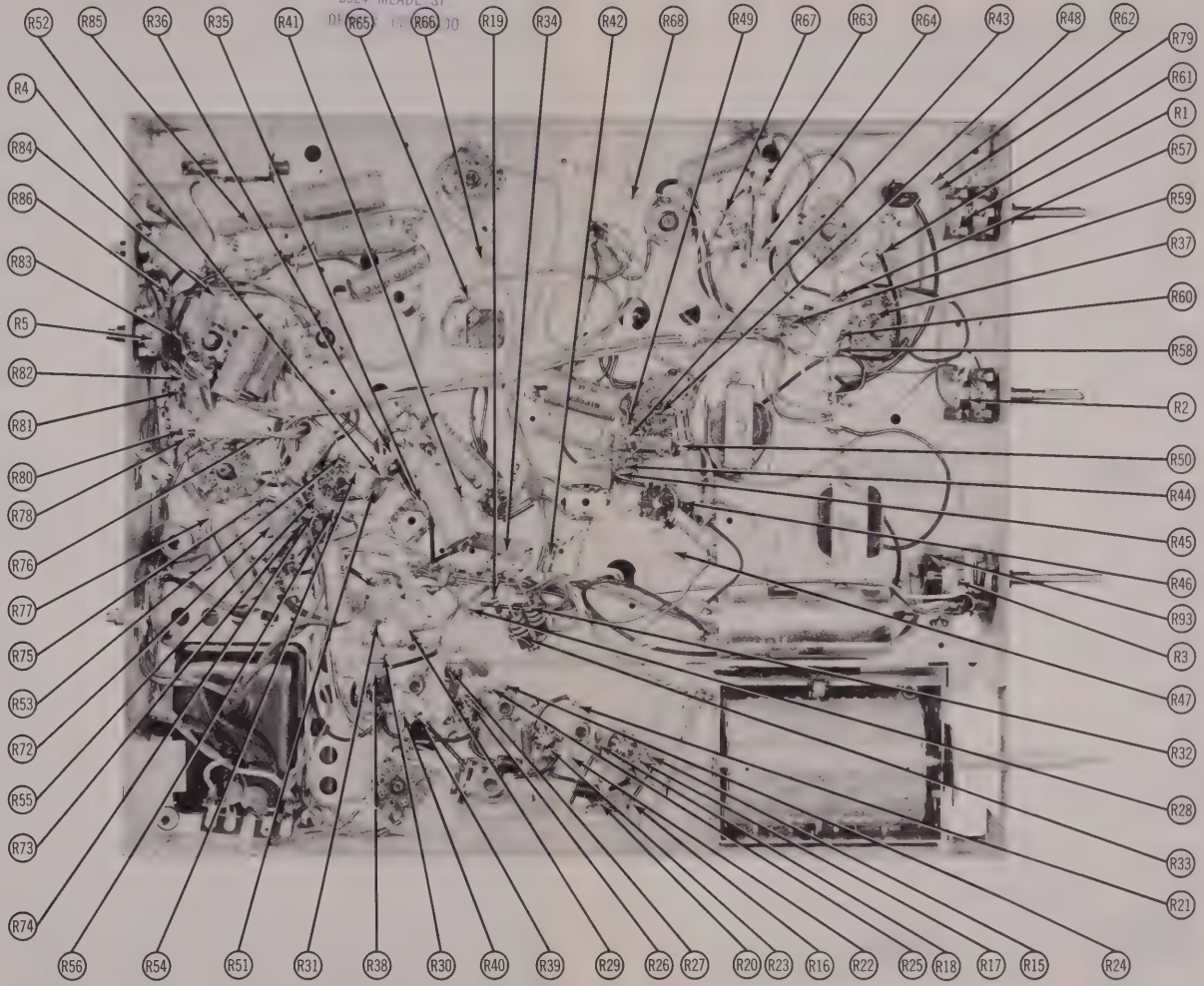

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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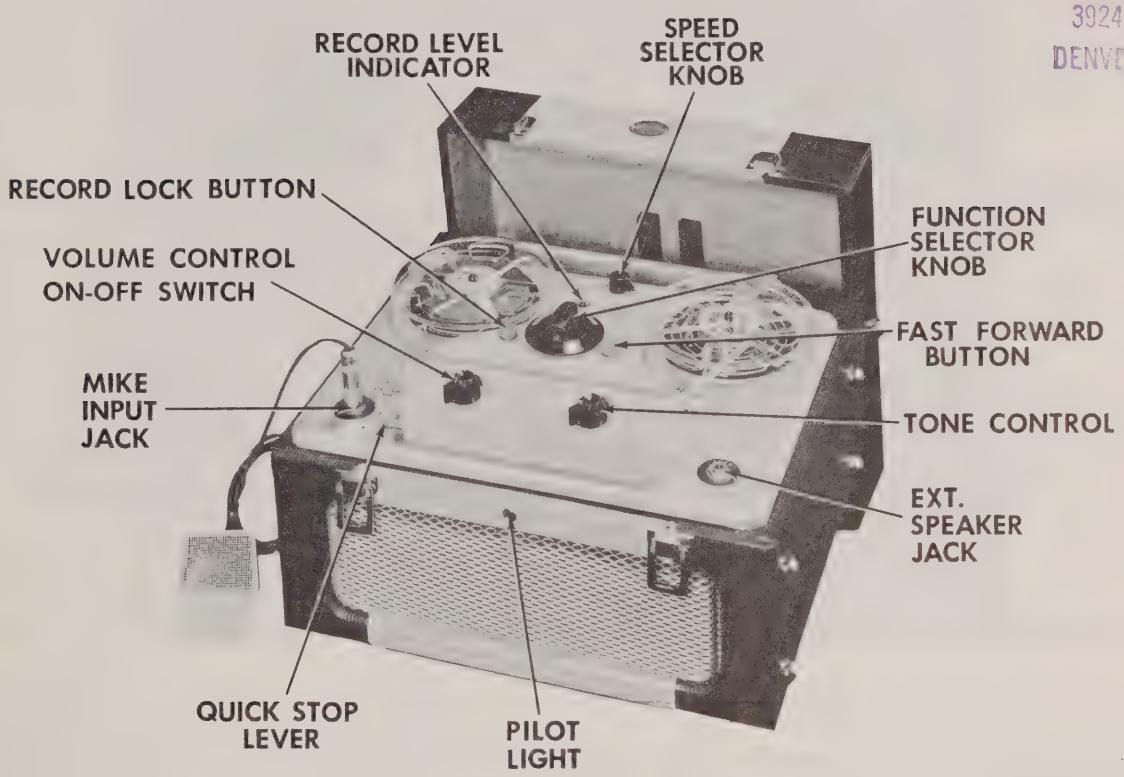

Figure 1

GENERAL INFORMATION

The F-M-E Model 37-B is a two speed (3 3/4 and 7 1/2 I. P. S.) tape recorder with capstan drive. A mechanical control engages the tape with the capstan and positions the tape to the head. This control is also used to actuate an electrical switch to transfer the amplifier circuits from "Play" to "Record".

The F-M-E is designed to record and play back two tracks of material on standard recording tape with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played through the self-contained speaker or an external speaker may be used through use of the jack labeled "Spkr".

Model 37-B is designed to operate on 60 cycle, 110-120 volts, AC supply only.

CAUTION: Severe Damage Will Result If Connection Is Made To A Direct Current (DC) Line.

Manufactured by:

Federal Manufacturing & Engineering Corp.
199-217 Steuben Street
Brooklyn 5, New York

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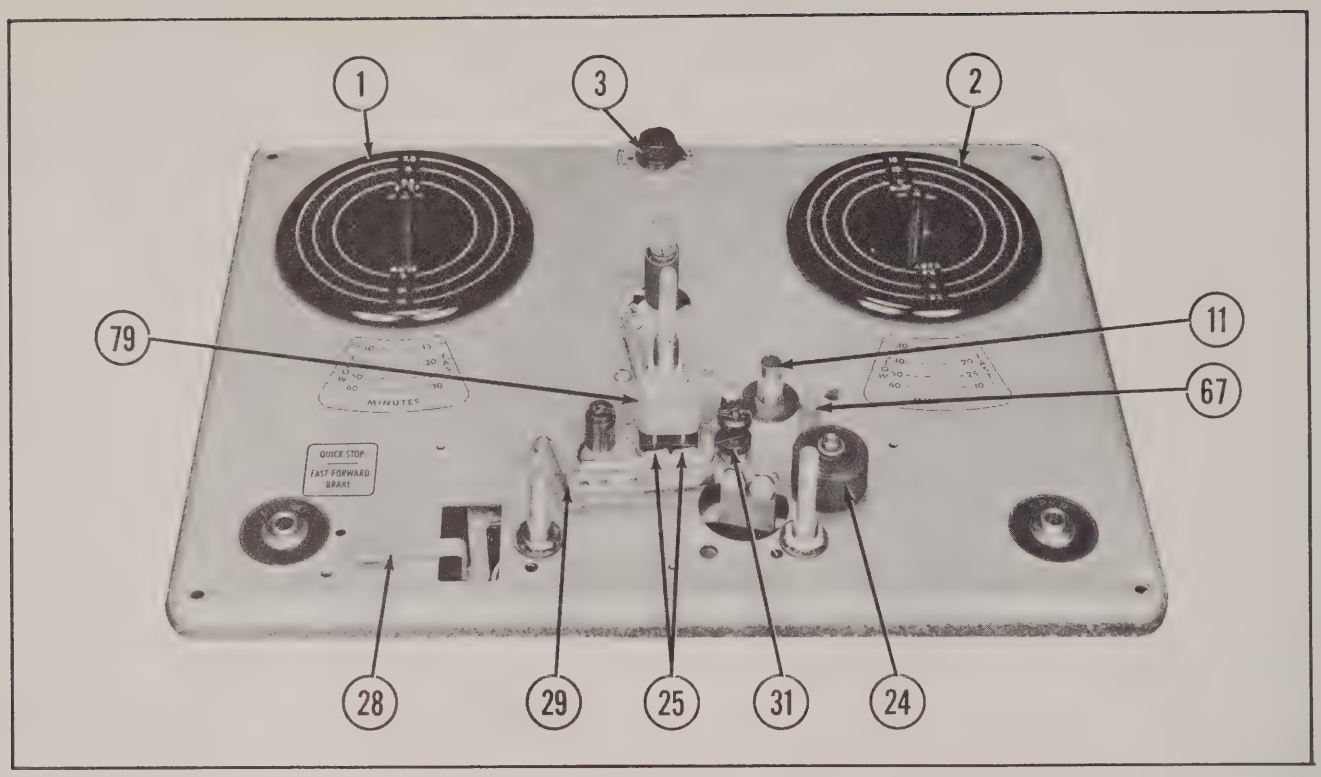

Figure 2

OPERATING POSITION

Place the recorder on a table or on any other hard, smooth surface. Do not place it on a soft, yielding material such as a rug, since this might come into contact with the ventilator opening at the bottom of the case, and impede the free circulation of air. The storage compartment should be emptied in order to obtain maximum ventilation.

OPERATING INSTRUCTIONS

1. With selector knob (4) and the "Volume Control Knob" in the "Off" position, insert the AC cord plug in a convenient wall receptacle of the proper rating.

Threading The Tape-

With selector knob (4) in the "Off" position, place an empty reel on the right hand (take-up) spindle. Place a loaded reel of tape on the left hand (supply) spindle so that it unwinds counterclockwise. Unreel about ten inches of tape from the supply reel for ease of threading the machine. Thread tape, following threading slot between the two plastic escutcheons. Make sure that the tape is not twisted, and that it passes in front of the recording head and the tape guide stud, and in back of the pressure roller. Insert the free end of the tape into the hub slot of the take-up reel, then wind the reel one or two times counterclockwise to take up all slack.

NOTE: Make certain that the glossy (or uncoated) side of the tape faces the front of the recorder.

To Record-

1. Insert the microphone plug into the input jack labeled "Micro".

2. With selector knob (4) in the "Off" position, set speed selector knob (3) in the desired position.

3. While pressing down firmly on record lock button (10), turn selector knob (4) to "Record" position. Then release record lock button (10). This button insures against accidental erasure of any recording which may already be on the tape.

4. While talking into the mircophone, adjust the "Volume" control until the Neon Recording Indicator just begins to flicker.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the Recording Indicator to flash, will result in weak playback and high background noise, Too strong a signal, causing the Recording Indicator to glow steadily, will result in distortion during playback.

5. The "Tone Control" should be set at full treble position when recording.

To Record From Radio, TV Or Phonograph-

Recordings can be made from a radio or television receiver, or phonograph, by placing the microphone near the speaker of such instruments. However, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which, as a result, will be recorded on the tape. A superior quality recording can be made by use of a radio-phono attachment cord. Connect attachment cord as follows:

1. The two alligator clips at one end of the attachment cord are connected across the voice coil terminals on the radio, television or phonograph speaker, while the plug at the other end is inserted into the input jack labeled "Micro".

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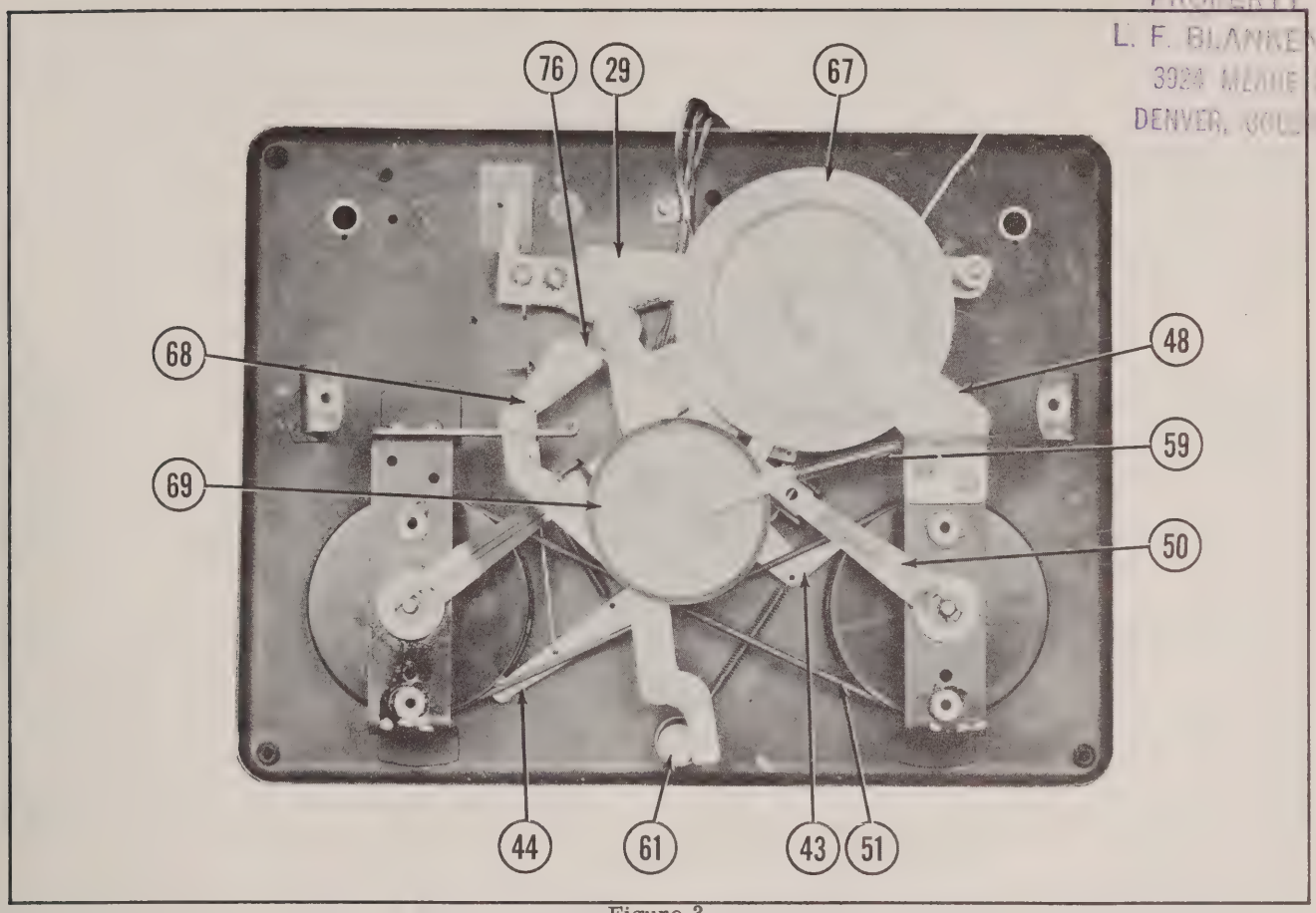

Figure 3

2. After tuning in the desired program proceed with the recording as described under "To Record".

Dual Track Recording-

The F-M-E is designed so that only 1/2 the tape width is recorded at a time, thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded; i. e. all the tape wound onto the right hand reel, turn selector knob (4) to "Off" position.

2. Remove the reels from the recorder, turning the full reel over and placing it on the left hand spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the first track of recording is ready to be played, without rewinding, by reversing the reels as described in Step #2 above.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at 60^0 angle with an overlap so ends will line up, join ends together with splicing tape on the glossy side and trim off any excessive width.

To Play Recordings-

1. Thread the tape as described under "Threading The Tape".

2. Turn the "Off-Volume" control clockwise until a click is heard and allow a few seconds for the tubes to warm up.

3. Turn selector knob (4) to "Play" position and adjust the "Volume" and "Tone" controls for desired listening level.

To Rewind-

To rewind a tape, turn selector knob (4) to "Rewind" position. To stop rewinding, turn selector knob (4) to "Off" position.

CAUTION: Do not turn selector knob (4) from "Rewind" to "Play" without stopping briefly at "Off", or the tape may break.

Fast Forward-

When playing back, any subsequent portion of the sound track can be quickly located without having

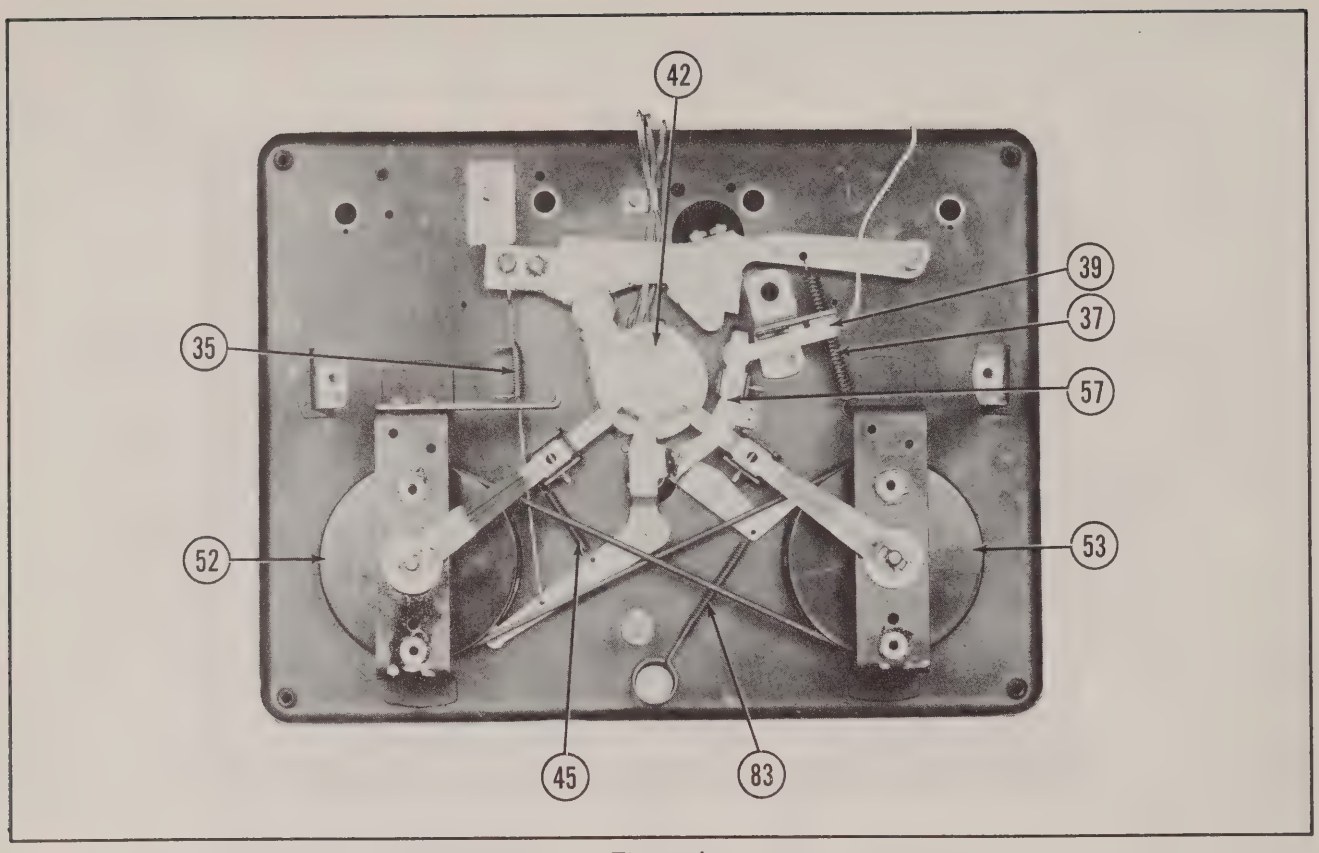

Figure 4

to play back the intervening portion. Pull the quick stop lever (28) forward all the way, and while holding it in this position, press down on fast forward button (9); the take-up reel will revolve at a greatly increased rate of speed so long as button (9) is held down. To stop the action of Fast Forward, first release fast forward button (9), and then release quick stop lever (28). The tape will then again be transported at the normal rate.

NOTE: The markings on the turntables, as well as on the top plate of the recorder, indicate the elapsed time and the time remaining. These markings serve as a guide in locating the approximate position of any desired portion of a recording.

Quick Stop Lever-

To stop the movement of the reels at any time while the recorder is in operation, for editing, dictating or any other purpose, pull quick stop lever (28) forward all the way. As long as the lever is held in this position, the reels will not turn.

External Speaker-

An external speaker jack (labeled "Spkr") is provided to permit the use of an external speaker. This jack accepts a standard phone plug. The external PM speaker should preferably be a 3.2 ohm speaker.

MODIFICATIONS

The following modifications have been incorporated on later production F-M-E Model 37-B Recorders:

1. In order to change drive belt (51), drive discs (52 and 53), and oilite bearings (80) without disassembling the chassis from the panel, both the feed spindle assembly (1) and the take-up spindle assembly (2) have been modified.

The spindles are now retained by "E" ring washer (64) and nylon washer (63). In addition, lift lever spring (62) has been added to reduce vibration of the lift levers (49 and 50). The lift levers are placed between nylon washer (63) and lift lever spring (62).

2. An interlock switch has been added that breaks both sides of the AC power line when the recorder is removed from the case. The interlock switch, Part #330-338, is rivited to the rear compartment grill by means of a bracket, Part #330-337. The wiring is slightly altered as shown on the schematic diagram. The terminal board located near the power transformer is now eliminated.

The lever of the interlock switch is activated by a block of wood which is glued into the case.

3. A hook-spring (82) has been added to the take-up bracket (77) to retain idler roller springs (59). This part was added to provide greater clearance between flywheel (67) and idler roller springs (59).

ADJUSTMENTS

Play-Record-Erase Head
Alignment Adjustment-

It is very important that the head be lined up perfectly with the tape. If it is not, low output, loss

of high frequencies or track overlap may result.

IMPORTANT: Before attempting to adjust the head make certain that the bottom of tape guide (31) clears the baseplate by 3/16". If not, turn tape guide (31) until this clearance exists. Apply a drop of glyptol to top of tape guide to lock tape guide in place. If the head still requires adjustment, proceed as follows:

Obtain a tape on which a 3,000 cycle signal has been recorded. This can be recorded on a good unit. Place this tape on the unit that the head is to be aligned on. Connect an output meter or AC voltmeter across the speaker voice coil. Play the 3,000 cycle tape, rock the head holder back and forth, turning screw (20) will allow you to do this, and notice a variation in the output voltage at the voice coil. Stop turning screw (20) when the highest meter reading is obtained.

Pressure Pad Adjustment-

Pressure pads (25) should be adjusted so that they just hold the tape in firm contact with the head. Too much tension can cause speed variation, excessive head, pressure pad and tape wear. Too little tension will cause poor erase, poor recordings and playback, or none at all. If operation indicates misadjustment, check as follows:

1. Place a short length of tape between the pressure pads and head but do not place tape between pressure roller and capstan shaft.

2. Place recorder in "Play" position but leave power "Off".

3. Form a loop in the left end of the tape that is suitable for attaching a spring scale.

4. Alternately, hold pressure pad springs (26 and 27) away from head while pulling tape with spring scale. A pull of approximately 3/4 oz. should be required to move tape. To adjust, bend pressure pad springs (26) and/or (27) in the required direction.

TROUBLES

Fails To Erase-

1. Pressure pad (25) worn or missing.
   (a) Replace pad.

2. Pressure erase spring (26) not adjusted properly, thus, not holding tape in firm contact with erase head.
   (a) Adjust as described under "Pressure Pad Adjustment".

Fails To Record Or Play Back-

1. Tape pressure pad (25) worn or missing, resulting in the tape not being held against the recording head.
   (a) Replace pressure pad.

2. Pressure record spring not adjusted properly.
   (a) Adjust as described under "Pressure Pad Adjustment".

Track Overlap-

Track overlap is when something recorded on one track will be heard in reverse when the tape is turned over to play the other track.
   (a) Mis-alignment of head. Adjust as described under "Play-Record-Erase Head Alignment Adjustment".

Speed Variation Or "Wow"-

1. Check flywheel assembly (67), pressure roller (24), idler wheels (66 and 69), motor drive pulley (54), and drive belt (51) for oil or foreign material. Clean these parts with alcohol or lighter fluid.

2. Check motor pulley (54) to see it it is secured to motor shaft.

3. Check idler roller springs (59) to see if they hold idler rollers in firm contact with motor pulley and flywheel.

4. Check all parts for freedom of movement. Clean any sluggish parts and lubricate as described under "Lubrication".

Tape Overruns Or Spills When Changing Functions-

1. Brake linings (47) worn or missing.
   (a) Replace.

2. Brake springs (35 and 83) broken, loose, or missing.
   (a) Replace.

CLEANING

The record head, capstan shaft, and pressure roller are subject to an accumulation of tape coating oxide, which is worn off the tape as it passes these parts. These parts should be cleaned periodically with a pipe-cleaner or with an absorbent cotton swab on an applicator stick, dampened slightly with water.

If the particles cannot be completely removed in this manner, the applicator may be dampened with alcohol or lighter fluid. Care should be exercised not to permit the solvent to come into contact with the plastic panels on which the controls are mounted.

LUBRICATION

The F-M-E Tape Recorder is equipped with Oilite bearings and should not require lubrication, with the exception of capstan bearing, unless it becomes necessary to replace parts.

Lubricate capstan bearing once a year. Apply a single drop of No. 10 machine oil (sewing-machine type) to the bearing, and run the machine in "Rewind" position for five minutes. With a clean cloth, wipe off all excess oil.

Proper lubricant for the following applications is Plastilube #1 made by The Warren Refining & Chemical Co. of Cleveland, Ohio:

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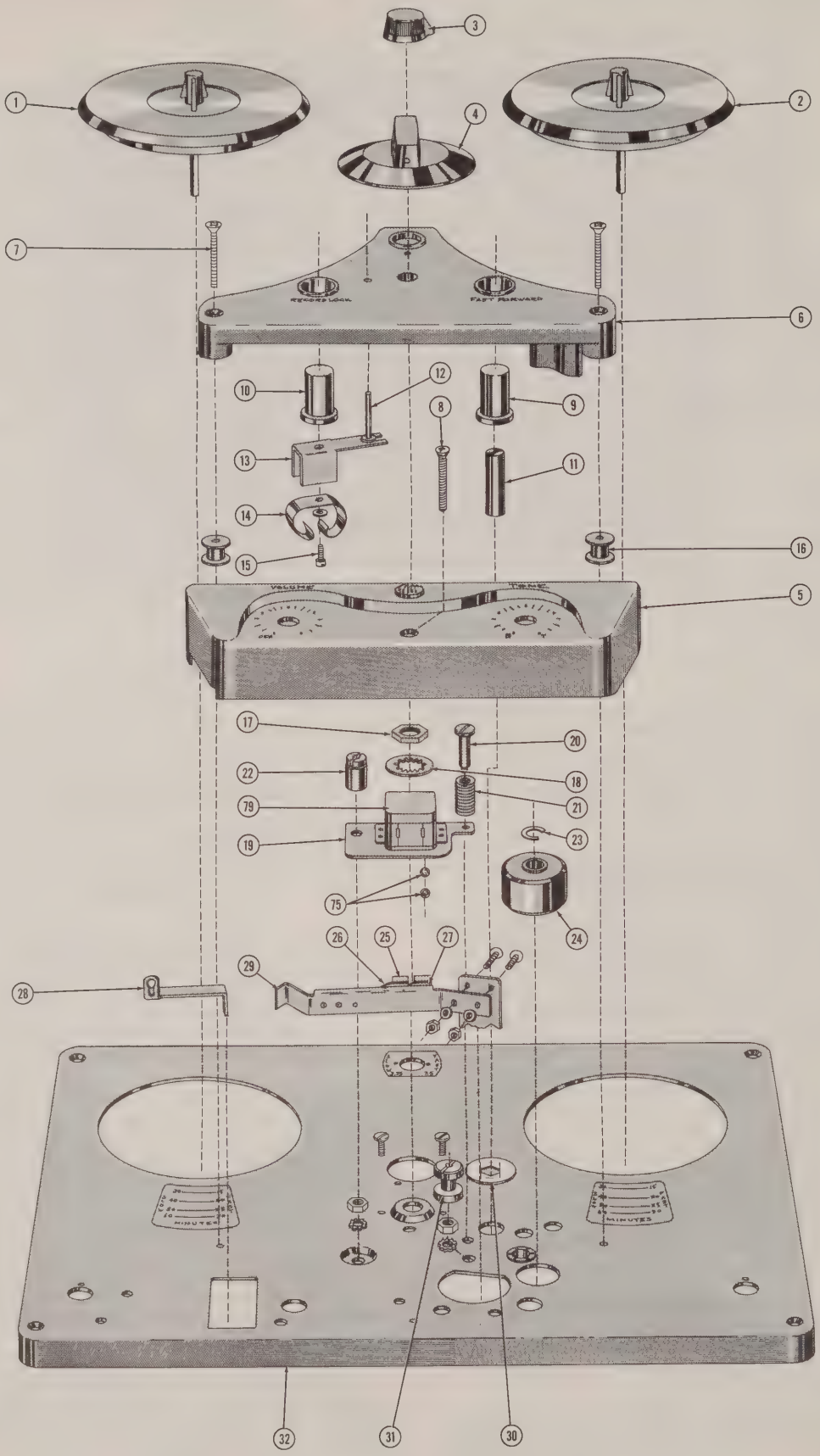

Figure 5A. Exploded View Of Parts Above Baseplate.

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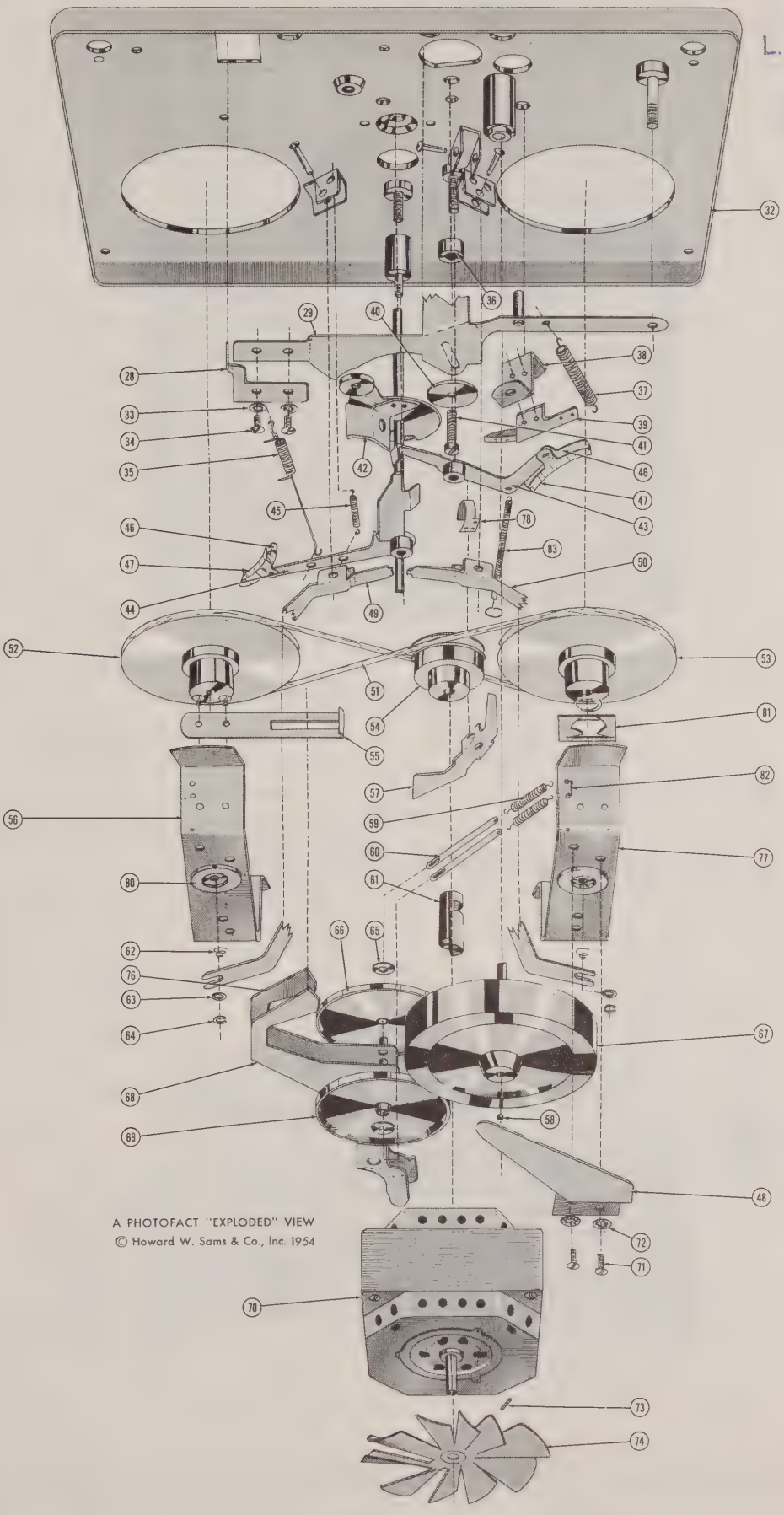


Figure 5B. Exploded View Of Parts Below Baseplate.

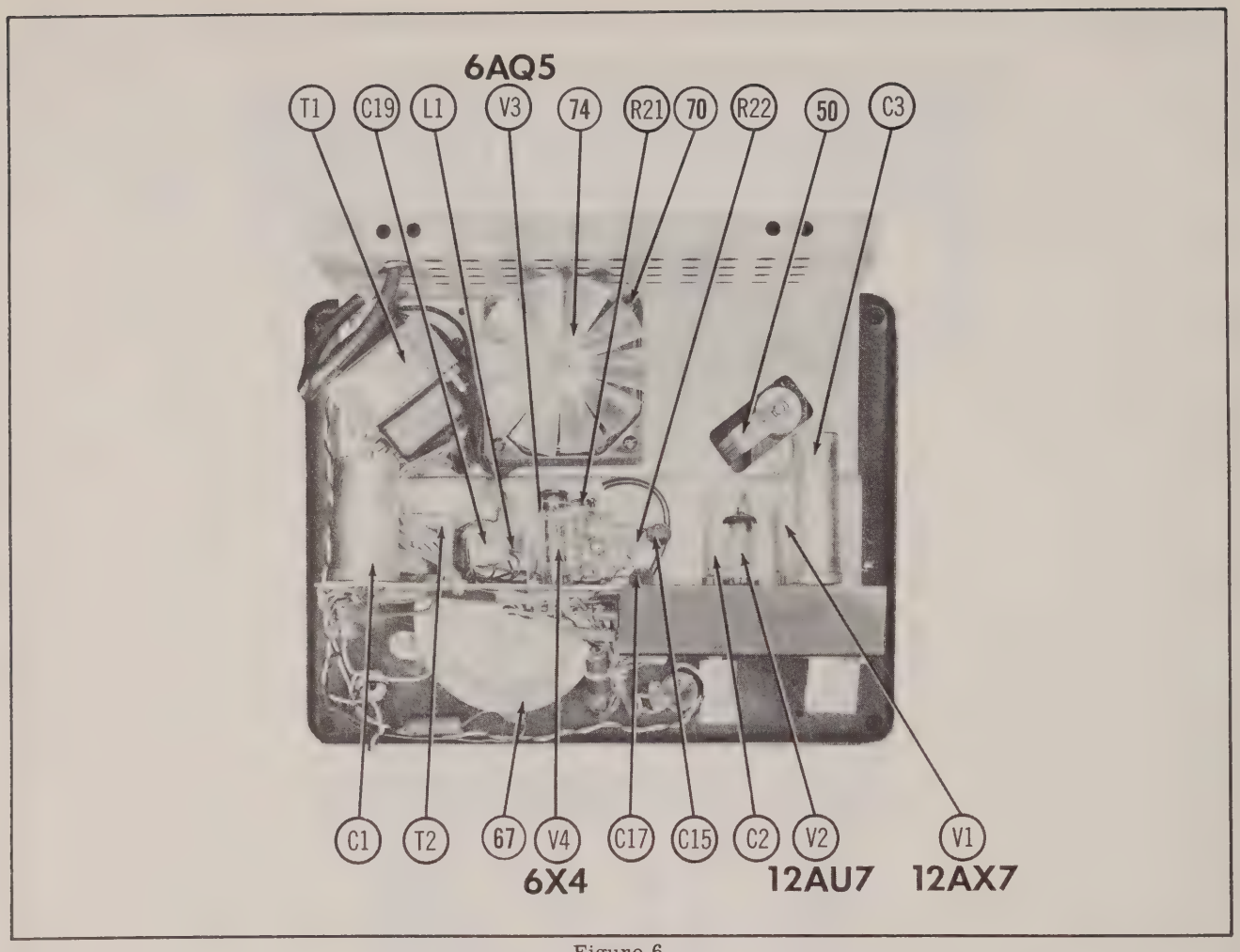


Figure 6

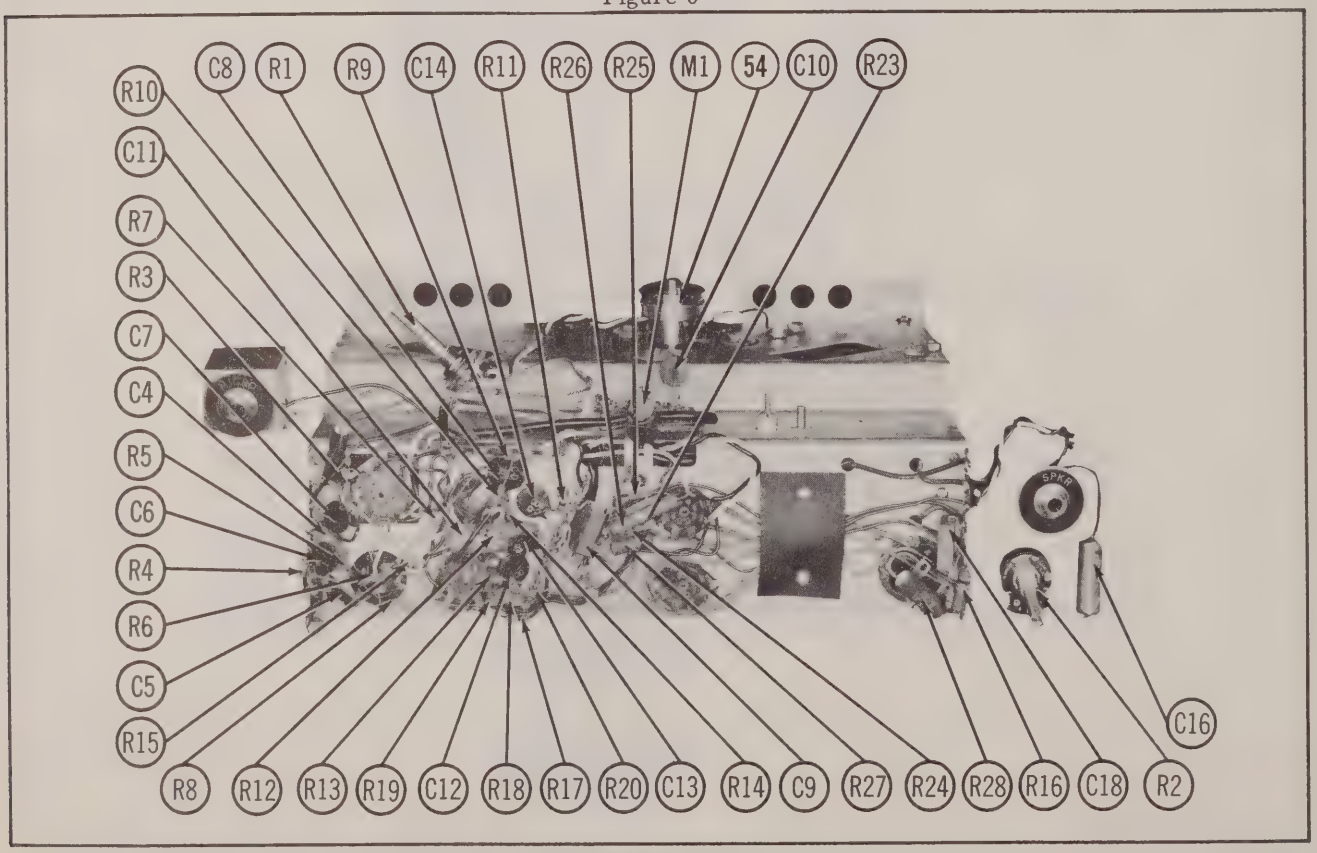
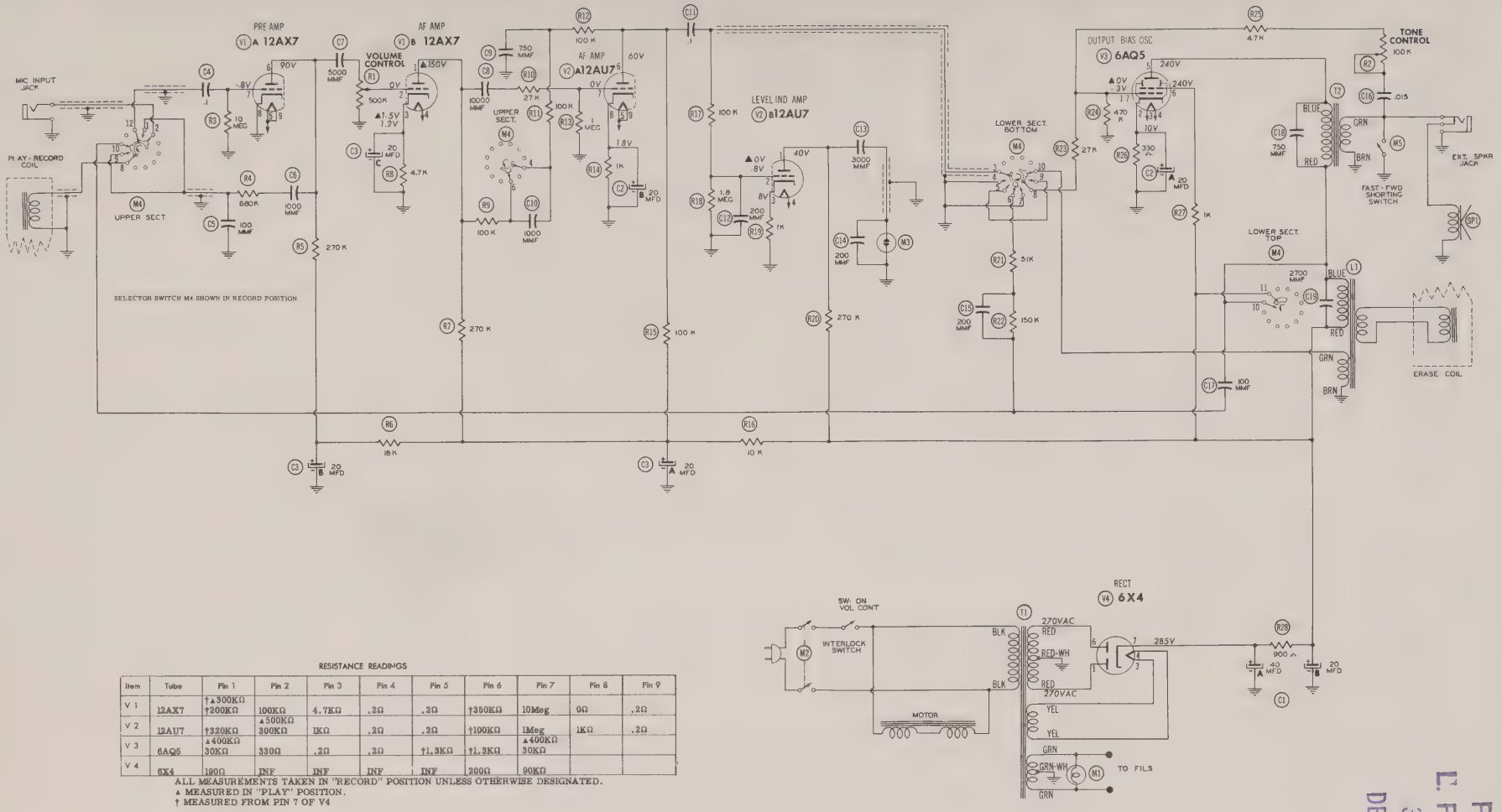


Figure 7



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†▲300KΩ †200KΩ	100KΩ	4.7KΩ	.2Ω	.2Ω	†350KΩ	10Meg	0Ω	.2Ω
V 2	12AU7	†320KΩ	▲500KΩ 300KΩ	1KΩ	.3Ω	.2Ω	†100KΩ	1Meg	1KΩ	.2Ω
V 3	6AQ5	▲400KΩ 30KΩ	330Ω	.2Ω	.2Ω	†1.3KΩ	†1.3KΩ	▲400KΩ 30KΩ		
V 4	6X4	190Ω	INF	INF	INF	INF	200Ω	90KΩ		

ALL MEASUREMENTS TAKEN IN "RECORD" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "PLAY" POSITION.
† MEASURED FROM PIN 7 OF V4

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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259-6

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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FEDERAL
MODEL 37-B

1. Oilite bearings (80), very thin coat.

2. Cam (42) at points of contact with lift levers and brakes.

3. Quick stop spring assembly (35).

4. Brake lever and pressure roller lever bushings.

5. Pressure roller guide washer.

6. Ball bearing pivots for record head.

7. Flywheel ball bearing pivot.

Proper lubricant for the following applications is Dixon's Graphite Lubricant made by J. Dixon Crucible Co. of Jersey City, New Jersey:

1. Cam guide washers at point of contact with pressure roller lever.

2. Cam throw out bracket at point of contact with idler roller levers.

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	330-410	12AX7, Pre-Amp., AF Amp.	R8	330-385	Resistor, 4.7KΩ, 1/2 Watt
V2	330-411	12AU7, AF Amp., Level Ind. Amp.	R9	330-390	Resistor, 100KΩ, 1/2 Watt
V3	330-412	6AQ5, Audio Output, Bias Oscillator	R10	330-392	Resistor, 27KΩ, 1/2 Watt, 10%
V4	330-413	6X4, Rectifier	R11	330-390	Resistor, 100KΩ, 1/2 Watt
C1A	330-359	Elect. Cap., 40mfd. @ 450V.	R12	330-390	Resistor, 100KΩ, 1/2 Watt
C1B		Elect. Cap., 20mfd. @ 450V.	R13	330-386	Resistor, 1Meg., 1/2 Watt
C2A	330-358	Elect. Cap., 20mfd. @ 25V.	R14	330-387	Resistor, 1KΩ, 1/2 Watt
C2B		Elect. Cap., 20mfd. @ 25V.	R15	330-390	Resistor, 100KΩ, 1/2 Watt
C3A	330-351	Elect. Cap., 20mfd. @ 450V.	R16	330-395	Resistor, 10KΩ, 1 Watt
C3B		Elect. Cap., 20mfd. @ 450V.	R17	330-390	Resistor, 100KΩ, 1/2 Watt
C3C		Elect. Cap., 20mfd. @ 25V.	R18	330-389	Resistor, 1.8Meg., 1/2 Watt
C4	330-353	Cap., .1mfd. @ 400V.	R19	330-387	Resistor, 1KΩ, 1/2 Watt
C5	330-361	Cap., 100mmf., Ceramic	R20	330-382	Resistor, 270KΩ, 1/2 Watt, 10%
C6	330-357	Cap., 1000mmf., Ceramic	R21	330-380	Resistor, 51KΩ, 1/2 Watt, 5%
C7	330-355	Cap., 5000mmf., Ceramic	R22	330-388	Resistor, 150KΩ, 1/2 Watt
C8	330-352	Cap., 10,000mmf., Ceramic	R23	330-392	Resistor, 27KΩ, 1/2 Watt, 10%
C9	330-350	Cap., 750mmf., 10% Mica	R24	330-391	Resistor, 470KΩ, 1/2 Watt
C10	330-357	Cap., 1000mmf., Ceramic	R25	330-385	Resistor, 4.7KΩ, 1/2 Watt, 10%
C11	330-353	Cap., .1mfd. @ 400V.	R26	330-393	Resistor, 330Ω, 2 Watt
C12	330-354	Cap., 200mmf., Ceramic	R27	330-394	Resistor, 1KΩ, 1 Watt
C13	330-356	Cap., 3000mmf., Ceramic	R28	330-396	Resistor, 900Ω, 5 Watt, W.W.
C14	330-354	Cap., 200mmf., Ceramic	T1	330-161	Power Transformer
C15	330-354	Cap., 200mmf., Ceramic	T2	330-314	Output Transformer
C16	330-360	Cap., .015mfd. @ 600V.	SP1	330-313	Speaker, 5" x 7" - PM 4Ω
C17	330-361	Cap., 100mmf., Ceramic	L1	330-490	Oscillator Coil Assembly
C18	330-350	Cap., 750mmf., 10% Mica		330-492	Core, Oscillator Coil
C19	330-363	Cap., 2700mmf., Mica	M1	330-374	Pilot Lamp (#44)
R1	330-316	Volume Cont. & Switch, 500KΩ	M2	330-338	Interlock Switch
R2	330-315	Tone Cont., 100KΩ	M3	330-373	Neon Lamp, Record Level Ind. (NE-51)
R3	330-381	Resistor, 10Meg., 1/2 Watt			
R4	330-384	Resistor, 680KΩ, 1/2 Watt, 10%	M4	330-181	Selector Switch
R5	330-382	Resistor, 270KΩ, 1/2 Watt, 10%	M5		Fast Forward Shorting Switch (Item 39 on Exploded View)
R6	330-383	Resistor, 18KΩ, 1/2 Watt, 10%			
R7	330-382	Resistor, 270KΩ, 1/2 Watt, 10%			

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MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	330-120	Feed Spindle Assembly
2	330-130	Take-Up Spindle Assembly
3	330-118	Speed Selector Knob
4	330-46	Selector Knob
5	330-59	Sub Panel
6	330-151	Switch Plate
7	SDT-615-2	6-32 x 1 1/2 Phillips HSS N. P.
8	SDT-614-2	6-32 x 1 1/4 Phillips SMS N. P.
9	330-156	Fast Forward Button
10	330-156	Record Lock Button
11	330-54	Fast Forward Plunger
12	330-152	Selector Knob Stop Pin
13	330-149	Stop Bracket
14	330-154	Selector Knob Stop Spring
15	PGR-21	6-32 x 1/4 Rd. Hd. Self Tapping
16	330-58	Tape Guide
17		Nut
18		Internal Lock Washer
19	330-240	Recording & Erasing Head Assy.
20	SCB-610-3	6-32 x 3/4, BD HSMS-Zinc Plate
21	330-44	Spring, Recording Head Adjusting
22	330-242	Tape Guide Nut
23		"C" Washer
24	330-50	Pressure Roller
25	330-38	Felt Pressure Pad
26	330-52	Pressure Erase Spring
27	330-53	Pressure Record Spring
28		Quick Stop Lever
29	330-55	Pressure Roller Sub-Assembly
30	330-45	Speednut, Tinnerman
31	330-43	Tape Guide
32	330-71	Panel
33		Internal Lock Washer
34		Screw
35	330-30	Quick Stop Spring & Rod Assy.
36	330-35	Pressure Roller Lever Bushing
37	330-67	Spring, Pressure Roller Lever
38		Shorting Switch Bracket
39	330-230	Shorting Switch Assembly
40	330-60	Washer, Bearing
41		Screw
42	330-180	Cam & Switch Assembly
43	330-104	Take-Up Brake Lever
44	330-211	Feed Brake Lever
45	330-201	Brake Lever Spring
46	330-221	Brake Shoe
47	330-222	Brake Lining
48	330-72	Flywheel Support Bracket
49	330-69	Spindle Lift Lever
50	330-69	Spindle Lift Lever
51	330-66	Drive Belt
52	330-63	Feed Drive Disc
53	330-63	Take-Up Drive Disc
54	330-164	Drive Pulley
55	330-194	Roller Push-Out Bracket
56	330-115	Feed Spindle Bracket
57	330-68	Fast Forward Lever
58	330-144	Ball Bearing, 5/32 Dia.
59	330-98	Idler Roller Springs
60	330-57	Spring Link
61		Speed Change Cam
62	330-37	Lift Lever Spring
63	WAS-275	Nylon Washer
64	RNG-23	"E" Type Retaining Washer
65	330-124	Nylon Washer
66	330-89	Small Roller
67	330-140	Flywheel Assy.
68	330-95	Large Roller Bracket Assy.
69	330-86	Large Roller
70	330-162	Drive Motor
71		Screw
72		Washer, Internal Lock
73		Set Screw
74	330-166	Fan Blade
75	330-41	Ball Bearings
76	330-100	Small Roller Bracket Assy.
77	330-111	Take-Up Spindle Bracket
78	330-234	Fast Forward Return Spring
79	330-243	Recording & Erasing Head, Shure TR5L
80	330-64	Bearing, Drive Disc Insert
81	330-114	Speednut, Tinnerman
82	330-145	Hook-Spring
83	330-103	Spring, Take-Up Brake Lever

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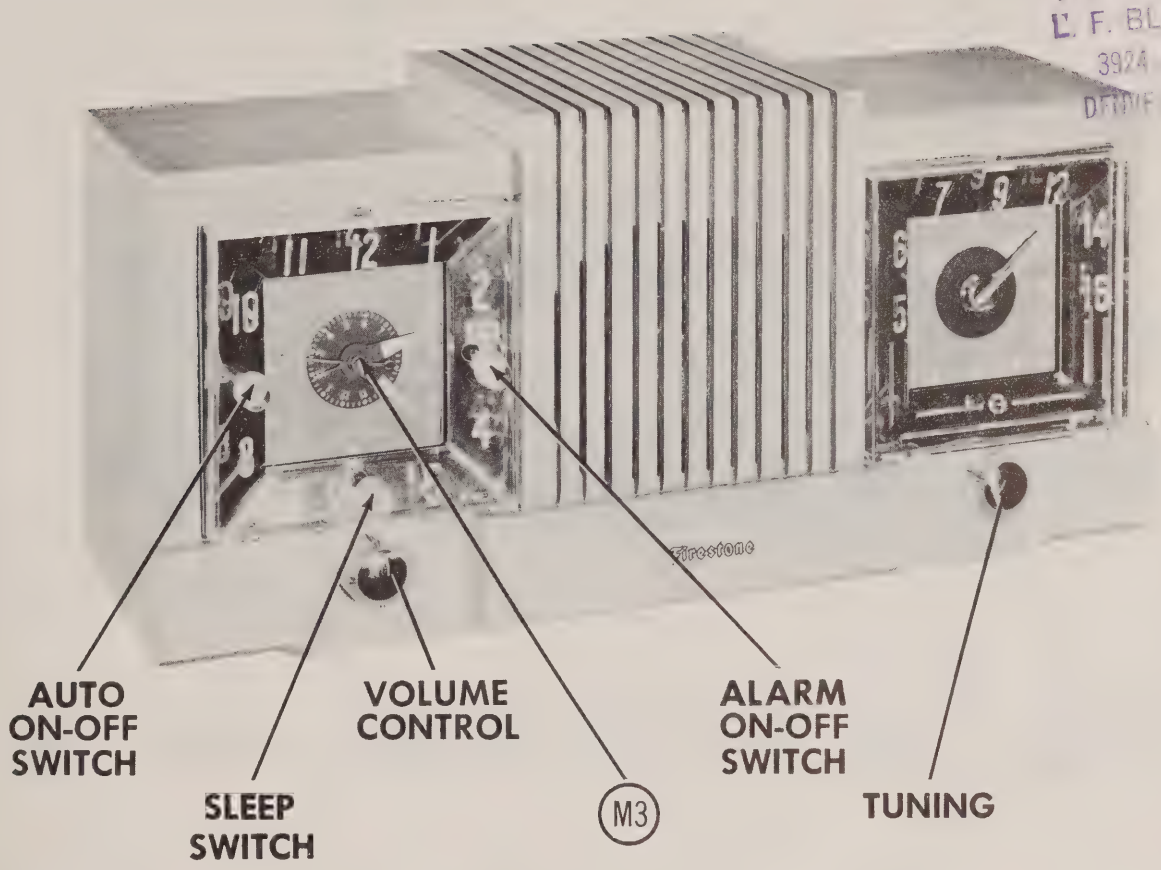

FIRESTONE MODELS
4-A-127, 4-A-128

MODEL 4-A-128

TRADE NAME	Firestone Models 4-A-127, 4-A-128 (Codes 120-4-UL100, 120-4-CL14)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	AC Operated AM Superheterodyne Receiver (Model 4-A-128 has Electric Clock)
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 (or) 12AT6) Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	538KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		FIRESTONE PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	12AT6 used as alternate
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■50	150	CE-601U	AFH2-16		B016		FP214	TVL-2435	
B	▲50	150								
C2	1000		CC-102	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C3	100		CC-101	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	.047	400	C473-4	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C5A	220		♦PC-151	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
B	5000									
C	5000									
D }	250									
E }										
C6	.01	600	C103-6	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C7	.047	400	CI473-4	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	

♦ Items C5A, C5B, C5C, C5D, C5E, R6A, R6B, R6C are combined in one unit.
When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	750KΩ	½	RV-152-A	Q13-137	A47-750K-Z	B-70	U-51	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R2	22KΩ	½	R223	BTS-22K	
R3	470KΩ	½	R474	BTS-470K	
R4	82Ω	½	R820	BTS-82	
R5	2.2Meg	½	R225	BTS-2.2Meg	
R6A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦PC-151	BTS-470K	
C	470KΩ	½		BTS-470K	

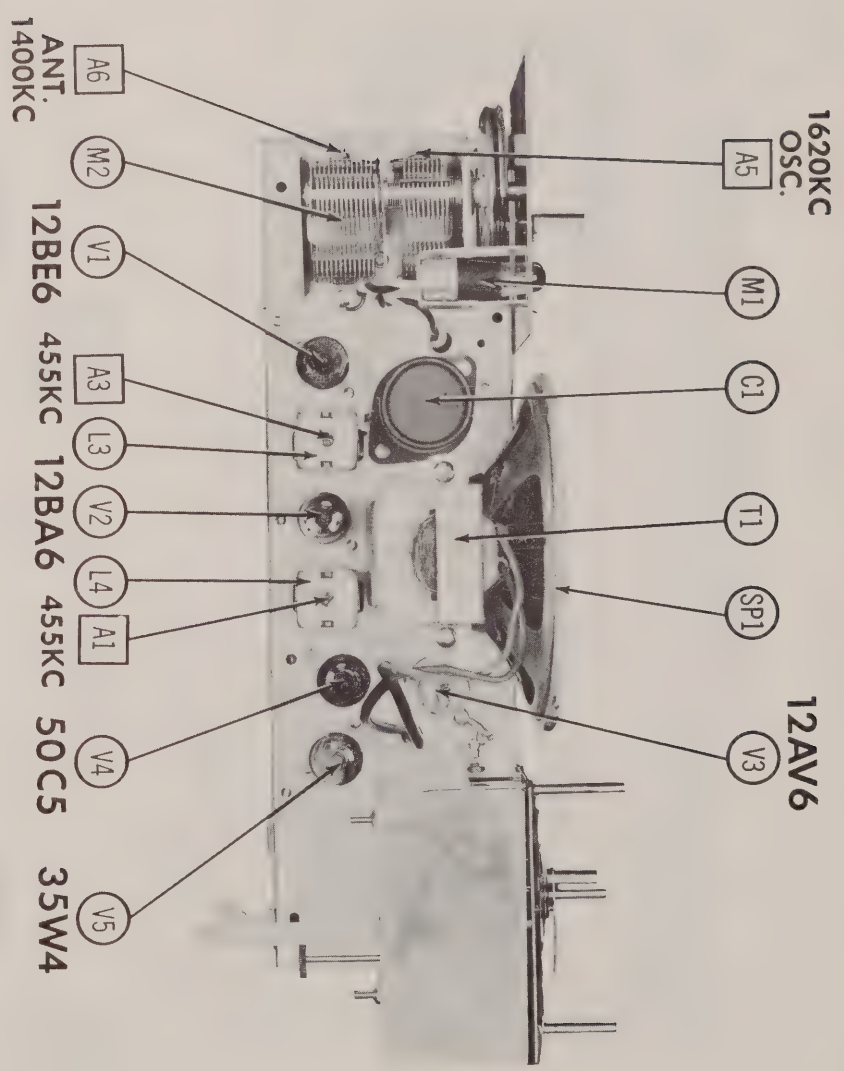
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R7	150Ω	½	R151	BTS-150	
R8	1500Ω	1	R152-1	BTA-1500	
R9	33Ω	½	R330	BTS-33	
R10	270KΩ	½	R274	BTS-270K	

♦ Items R6A, R6B, R6C, C5A, C5B, C5C, C5D and C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.5KΩ	3.3Ω	Part of Spkr.	A-3876	A-2928	S-1X	Z1001	24S50	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

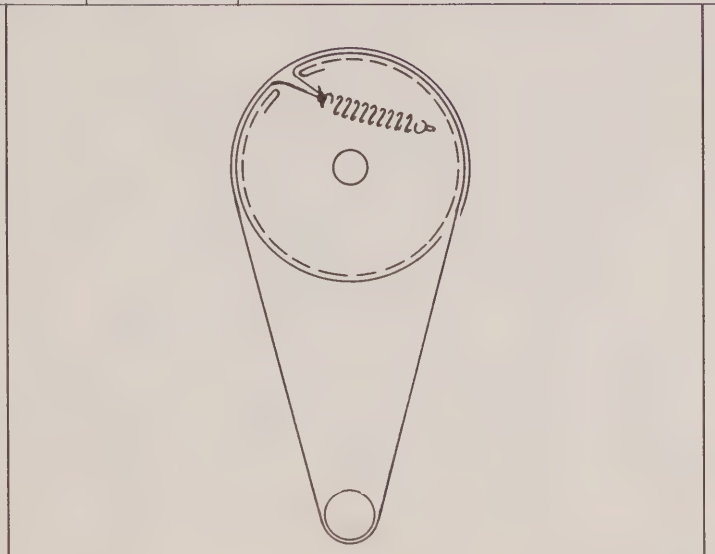
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.3Ω	PM-265	ST-105 Mod. P5-X	5A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.6Ω		L-A100				
L2	Osc.Coil	.9Ω	9Ω	L-204			70-Osc.*	
L3	Input IF	19Ω	19Ω	1655-6	16-6758	BC-352	12-C1	
L4	Output IF	19Ω	20Ω	1655-6	16-6758	BC-353	12-C2	
L5	RF Trap	0Ω		C14L				

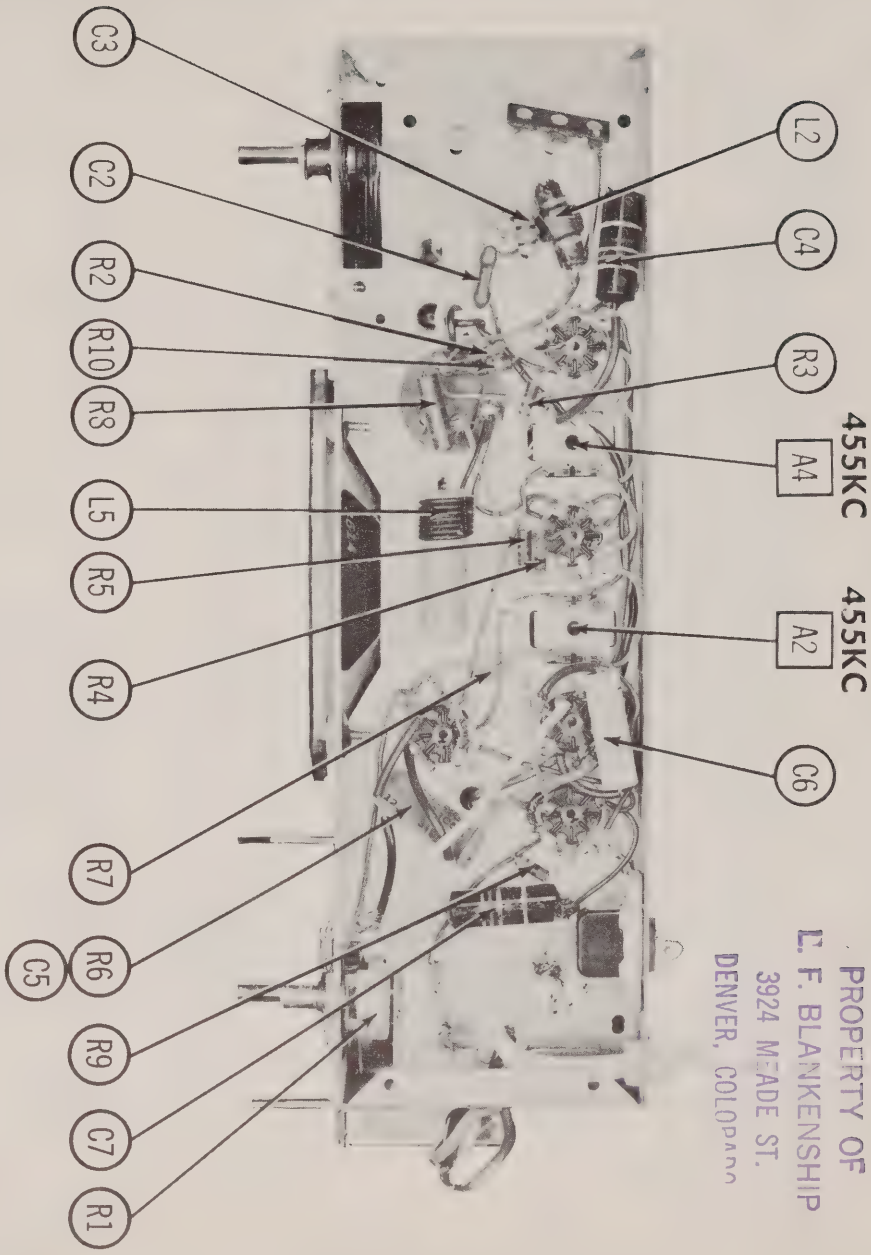
MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M1	Dial Light	T-47	#47, Bayonet
M2	Tuning Cap.	CV-149	43-462MMF, 34-200MMF
M3	Clock	C97G245	
	Cabinet	H-14	Specify finish
	Knob	H-112	Volume & tuning
	Knob	H-110	Clock - 3 used
	Shadow Box	H-98	Clock
	Shadow Box	H-99	Radio
	Dial Pointer	PT-100	



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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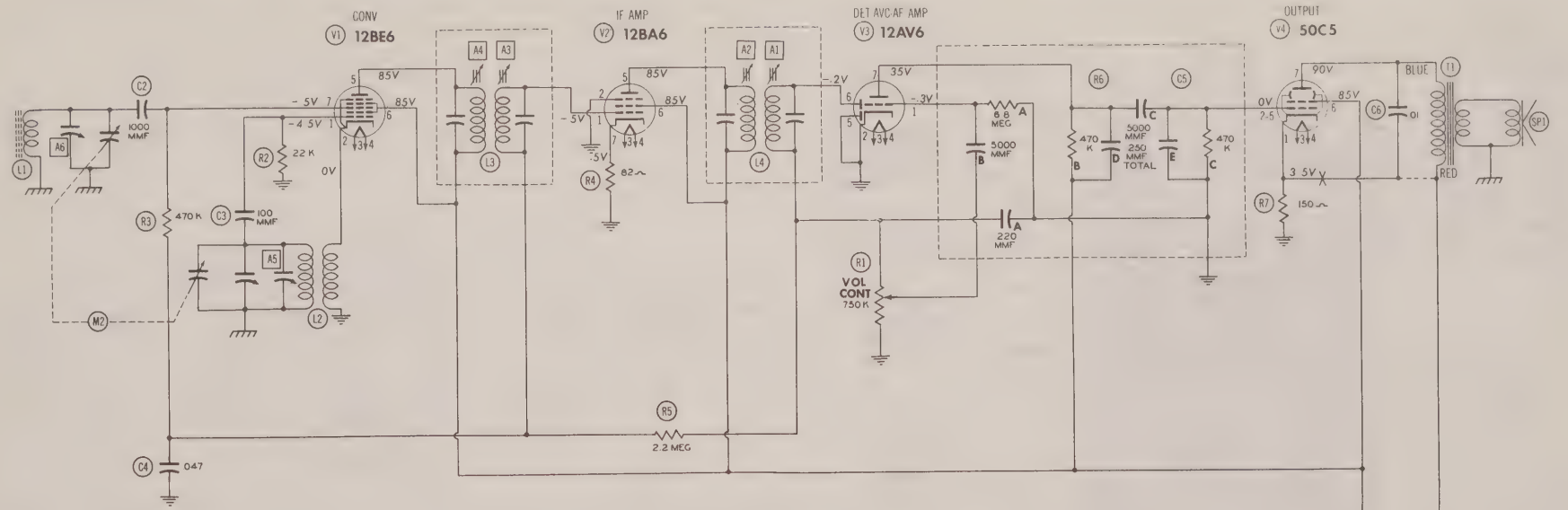
FIRESTONE
MODEL 4-A-127



IF=455KC

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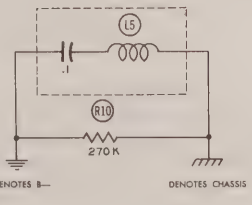
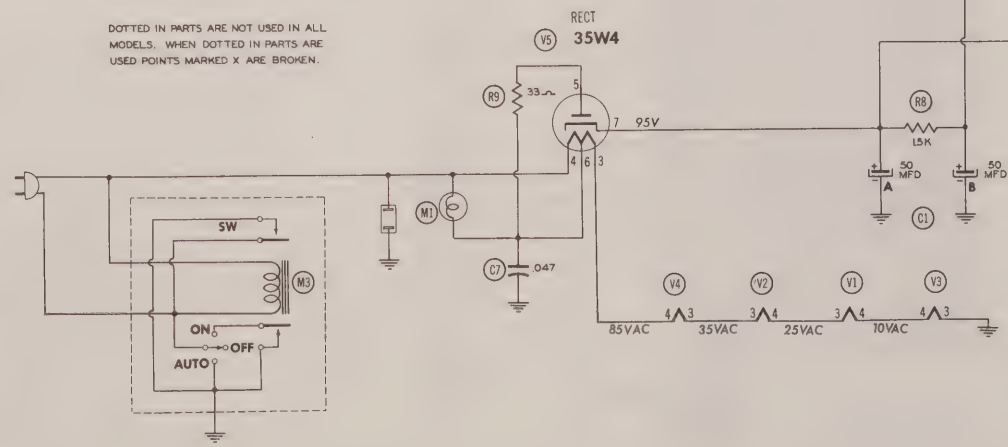


DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.9Ω	24Ω	1.2Ω	†1.5KΩ	†1.5KΩ	3.4Meg
V 2	12BA6	2.7Meg	0Ω	36Ω	24Ω	†1.5KΩ	†1.5KΩ	82Ω
V 3	12AV6	6.8Meg	0Ω	12Ω	0Ω	0Ω	750KΩ	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	†1.5KΩ	†380Ω
V 5	35W4	INF	0Ω	85Ω	120Ω	150Ω	112Ω	40KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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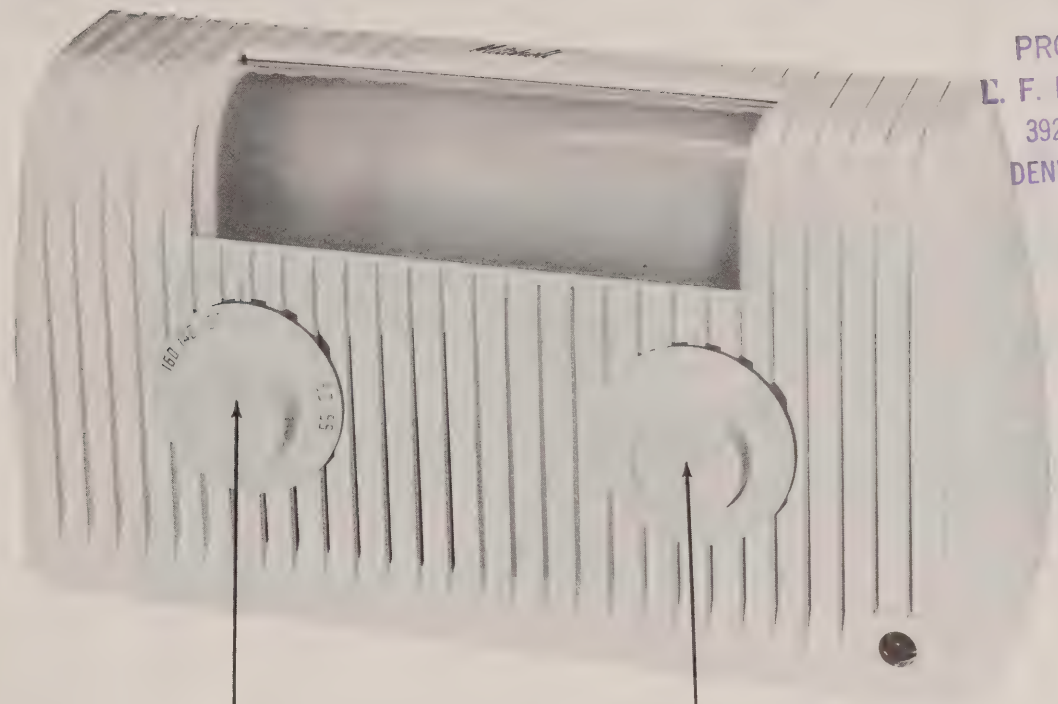
MITCHELL
MODELS 1261, 1262



MITCHELL
MODELS 1261, 1262

TRADE NAME	Mitchell Model 1261, 1262
MANUFACTURER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver With Bed Lamp
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to grid (pin 7) of converter (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC	"	A5	"

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PARTS LIST AND DESCRIPTIONS

MITCHELL MODEL 1261

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	N-8873	PRS150/50-30		BBRD5315		TCD497	TVA-2450	Blue
B	30	150								Red
C2	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	100		N-6015	S1100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C5	.005	600	N-4894	P688-005	D6-502	K080	GP2-333-502	DC-525	5HK-D5	
C6A	5000									
B	250		♦N-8215	♦PA-112-2	♦PC-71	♦112TM2	♦1406-02		♦T-4	
C										
C7	.02	400		P488-02	DF-203	CUB4S2		PT412	4TM-S2	
C8	.05	400	N-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C9	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

♦ Items C6A, C6B, C6C, R7A, R7B are combined in one unit.
When replacing separately, items C6B and C6C should total 250MMF

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ with 40KΩ stop	½	N-7890	Q13-133	A47-500K-Z	BSK-60-S	U-48	Volume -Note 1
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

Note 1. Connect a 40KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (control viewed from shaft end, terminals down).

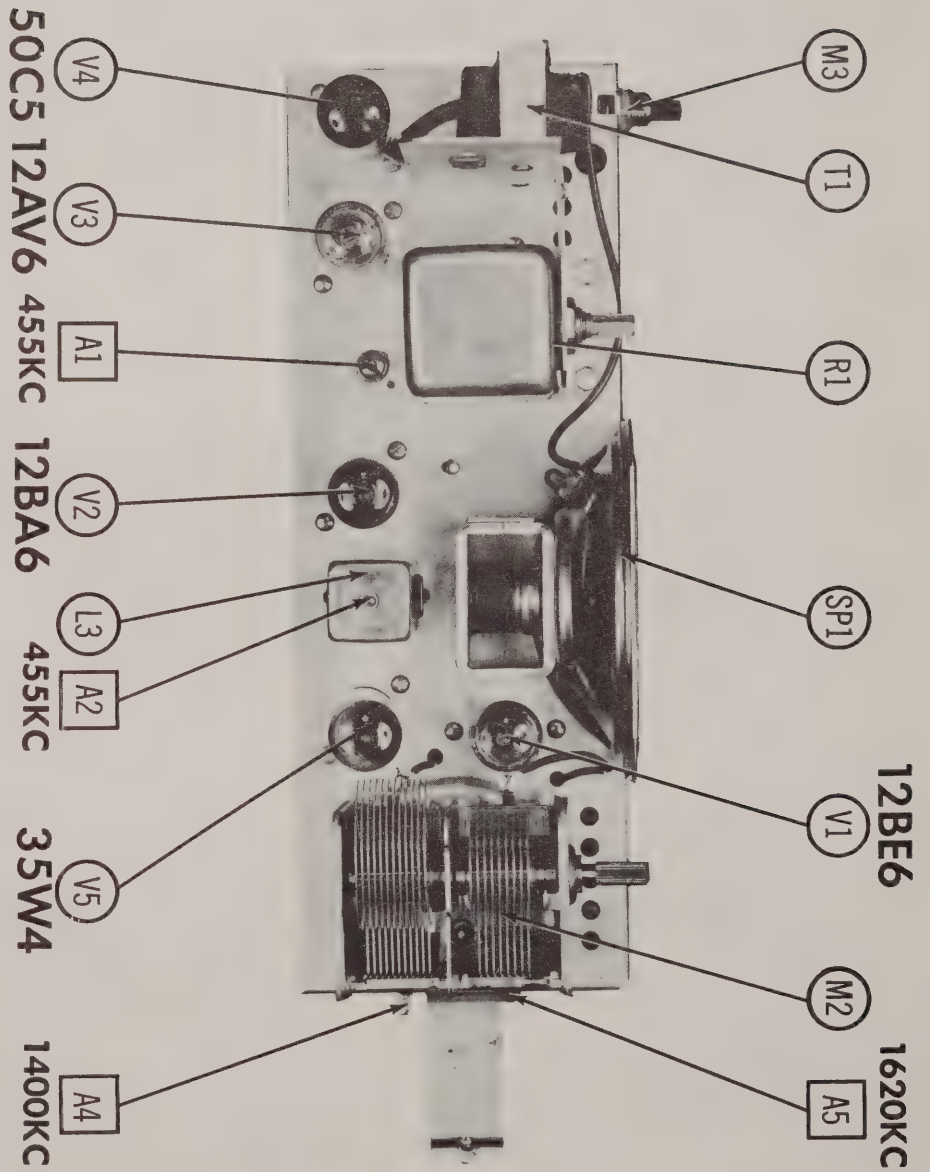
RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	NOTES
R2	22KΩ	½	N-4025	BTS-22K	
R3	910KΩ	½		BTS-910K	Note
R4	68Ω	½	N-6485	BTS-68	
R5	910KΩ	½		BTS-910K	Note
R6	6.8Meg	½	N-4028	BTS-6.8Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	NOTES
R7A	220KΩ	½	♦N-8215	BTS-220K	
B	470KΩ	½		BTS-470K	
R8	220Ω	½	N-4024	BTS-220	
R9	1200Ω	1	N-4900	BTA-1200	
R10	33Ω	½	N-4068		

♦ Items R7A, R7B, C6A, C6B, C6C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.3KΩ	3.2Ω	N-8799	A-3332	A-3025	S-12X	Z1101		

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MITCHELL PART No.	VIKING PART No.	QUAM PART No.	
SP1	3½"	PM	3.2Ω	N-8247	35J6	3A07	

COILS (RF-IF)

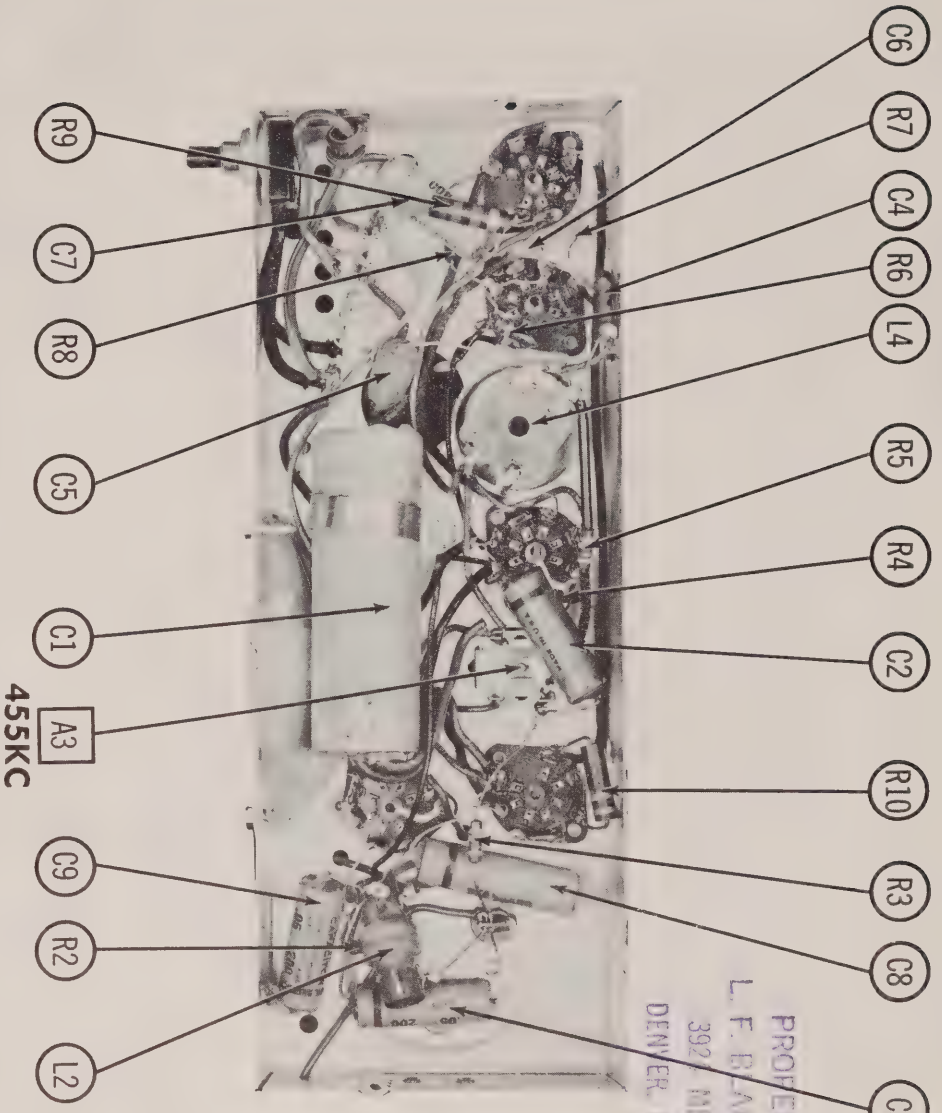
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MITCHELL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3Ω		N-8795				
L2	Osc. Coil	.6Ω	7.5Ω	N-8797	*14-1073		69-Osc.■	
L3	Input IF	16Ω	16Ω	N-7981	16-6758	BC-352	12-C1	
L4	Output IF	21Ω	21Ω	N-8796				

* Leads sufficient mounting support.
■ Drill mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M1	Show Case Lamp		120V-25 watt - medium screen base
M2	Tuning Cap.	N-8801	27-394MMF, 13-120MMF
M3	Switch		Bed Lamp

CHASSIS—BOTTOM VIEW



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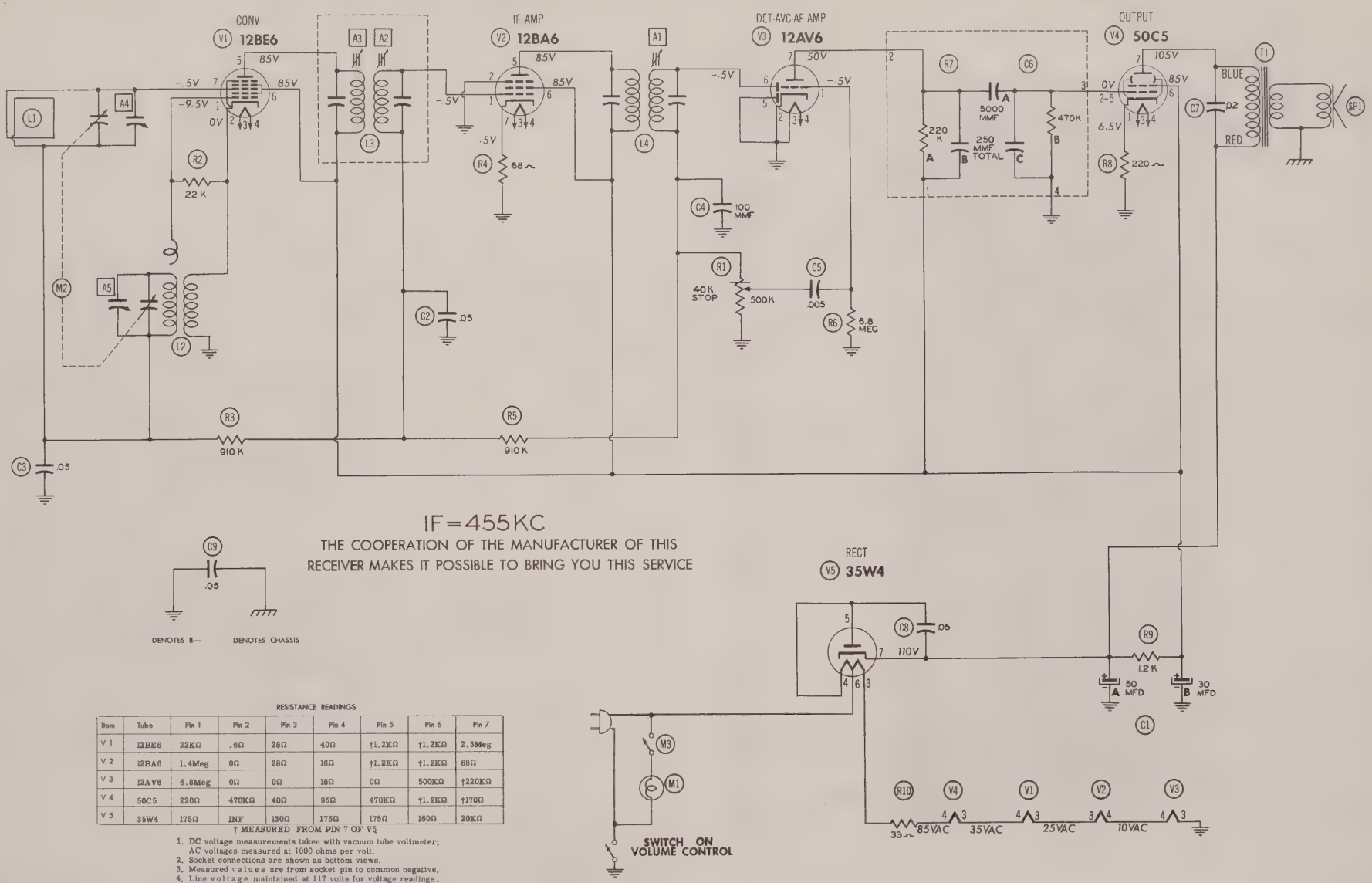

IF=455KC

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DENOTES B+ — DENOTES CHASSIS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	28Ω	40Ω	†1.2KΩ	†1.2KΩ	2.3Meg
V 2	12BA6	1.4Meg	0Ω	28Ω	16Ω	†1.2KΩ	†1.2KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	16Ω	0Ω	500KΩ	†220KΩ
V 4	50C5	220Ω	470KΩ	40Ω	95Ω	470KΩ	†1.2KΩ	†170Ω
V 5	35W4	175Ω	INF	130Ω	175Ω	175Ω	160Ω	20KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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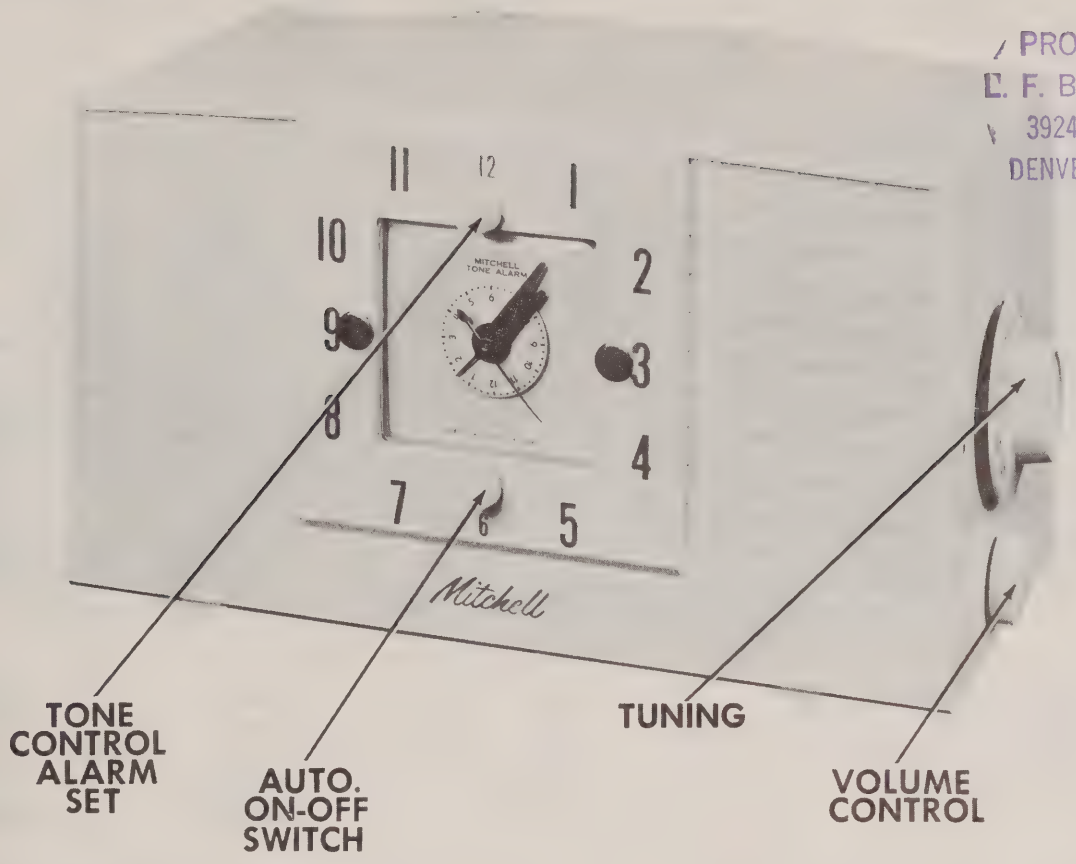

MITCHELL MODELS
1263, A, 1264, A

TRADE NAME	Mitchell Models 1263, A, 1264, A
MANUFACTURER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Four)	Types 12AU6 Conv., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1620KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A4	"
4.		"	600KC	Tune to 600KC signal	"		Bend slotted antenna rotor plates for maximum output. Repeat step 3.

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PARTS LIST AND DESCRIPTIONS

MITCHELL
MODEL 1263, A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MITCHELL PART No.	STANDARD REPLACEMENT		
V1	Converter	12AU6	12AU6	7BK	
V2	Det.-AF Amp.	12AV6	12AV6	7BT	
V3	Audio Output	50C5	50C5	7CV	
V4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150	N-8677	PRS150/50-30-20		BBRT5315C		TCT3107	TVA-3430	Blue
B	20	150								Red
C	20	15								Green
C2	50		N-6385	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C3	100		N-6015	SI100	D6-101	TP34	GP2K-101	UC-531	5GA-T1	
C4	.003	600	N-2063	P688-003	D6-302	CUB6D3	GP2-333-302	PT623	6TM-D3	
C5A	5000		*N-8215	*PA-112-2	*PC-71	*112TM2	*1406-02		*T-4	
B	250									
C										
C6	.01	400	N-1344	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C7	.05	400	N-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C8	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

* Items C5A, C5B, C5C, R5A and R5B are combined in one unit.
When replacing items individually items C5B and C5C should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	N-8674	Q13-139	A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MITCHELL PART No.	IRC PART No.	
R2	2.2Meg	½	N-4277	BTS-2.2Meg	
R3	6.8Meg	½	N-4028	BTS-6.8Meg	
R4	82Ω	2	N-4023		

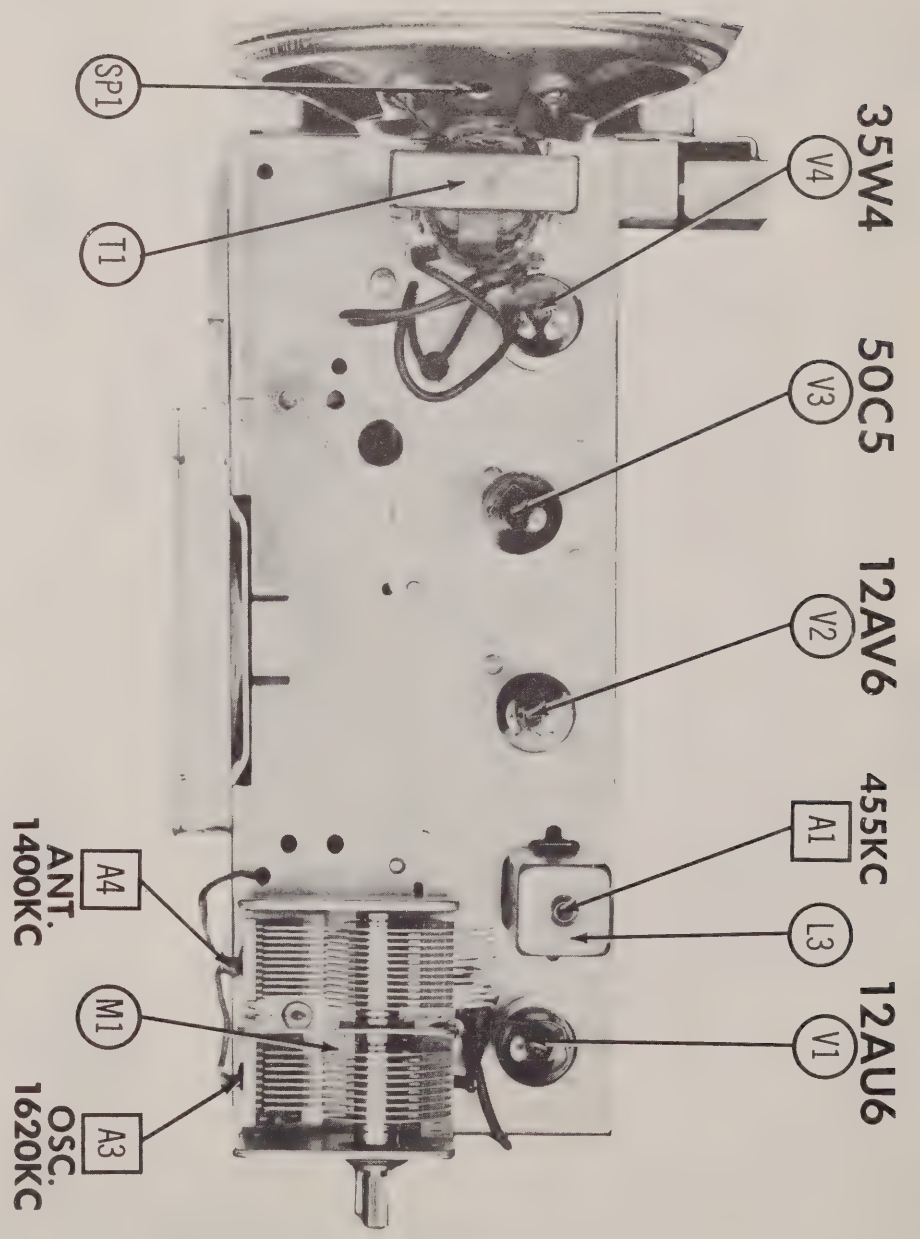
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MITCHELL PART No.	IRC PART No.	
R5A	220KΩ	½	*N-8215	BTS-220K	
B	470KΩ	½		BTS-470K	
R6	180Ω	½	N-4067	BTS-180	
R7	2200Ω	½	N-4896	BTS-2200	

♦ Items R5A, R5B, C5A, C5B, C5C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.6KΩ	3.7Ω	Part of Spkr.	A-3332 ①	A-3025 ①	S-12X ①	Z1101①		① Bend mounting tabs down, file out slots, mount on original mounting bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MITCHELL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1 L2 L3	Loop Ant. Osc. Coil IF Coil	2Ω 1Ω & 2.6Ω 28Ω *	7Ω 28Ω	N-8759 N-8681 N-7694				Includes cabinet back

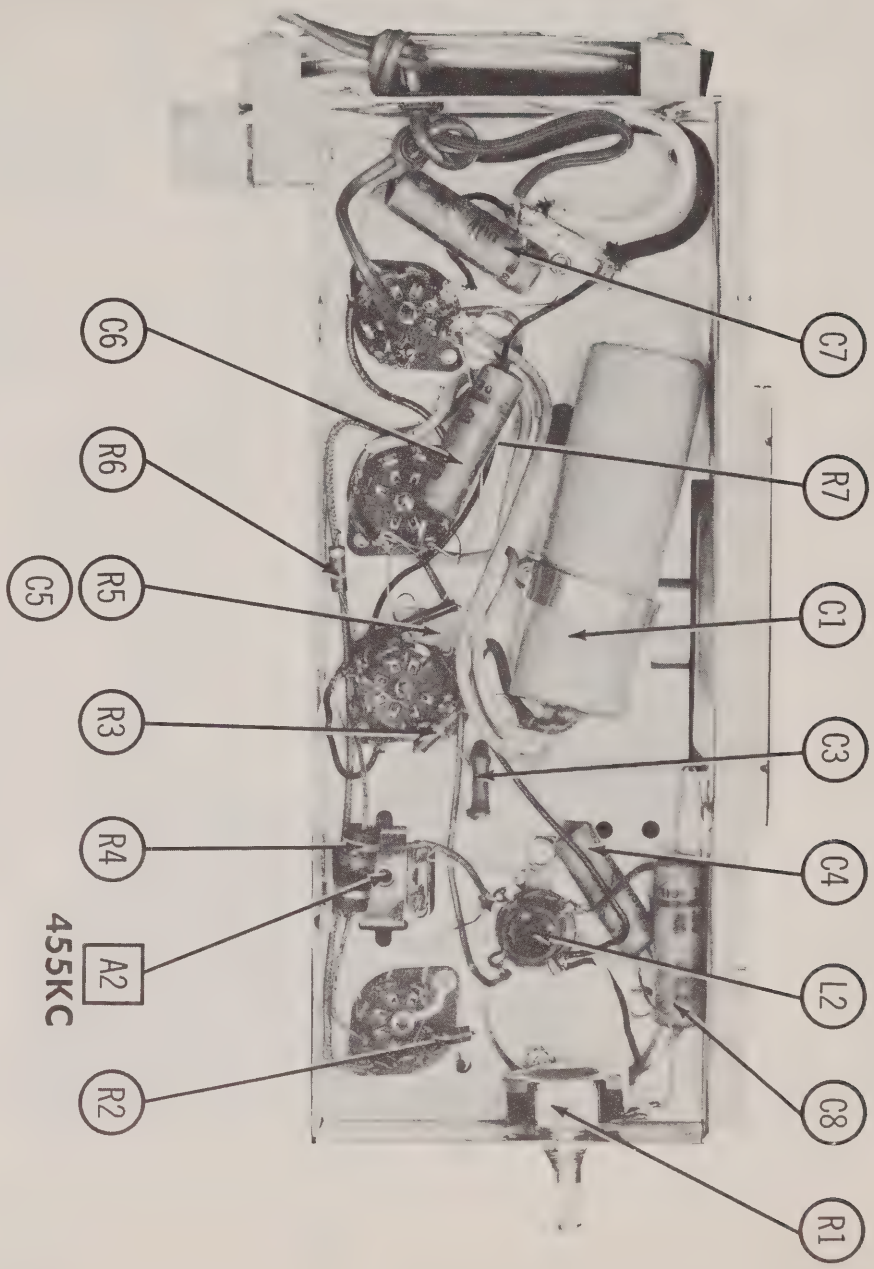
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MITCHELL PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.7Ω	N7824	ST-113 Mod. P4-X	4A07	

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M1	Tuning Cap.	N-8675	21-380MMF, 15-120MMF

CHASSIS—BOTTOM VIEW



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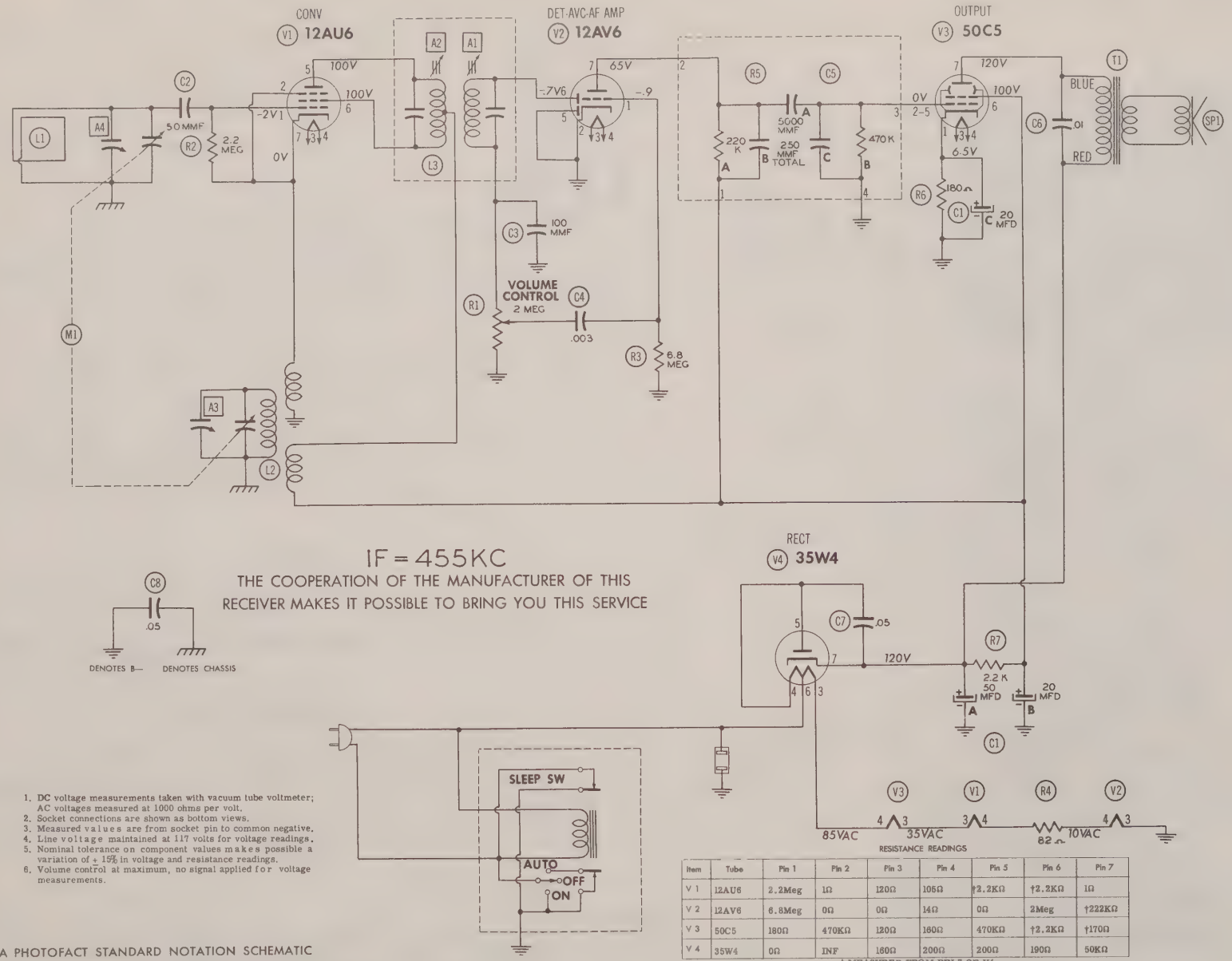

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	2.2Meg	1Ω	120Ω	105Ω	†2.2KΩ	†2.2KΩ	1Ω
V 2	12AV6	6.8Meg	0Ω	0Ω	14Ω	0Ω	2Meg	†222KΩ
V 3	50C5	180Ω	470KΩ	120Ω	160Ω	470KΩ	†2.2KΩ	†170Ω
V 4	35W4	0Ω	INF	180Ω	200Ω	200Ω	190Ω	50KΩ

† MEASURED FROM PIN 7 OF V4

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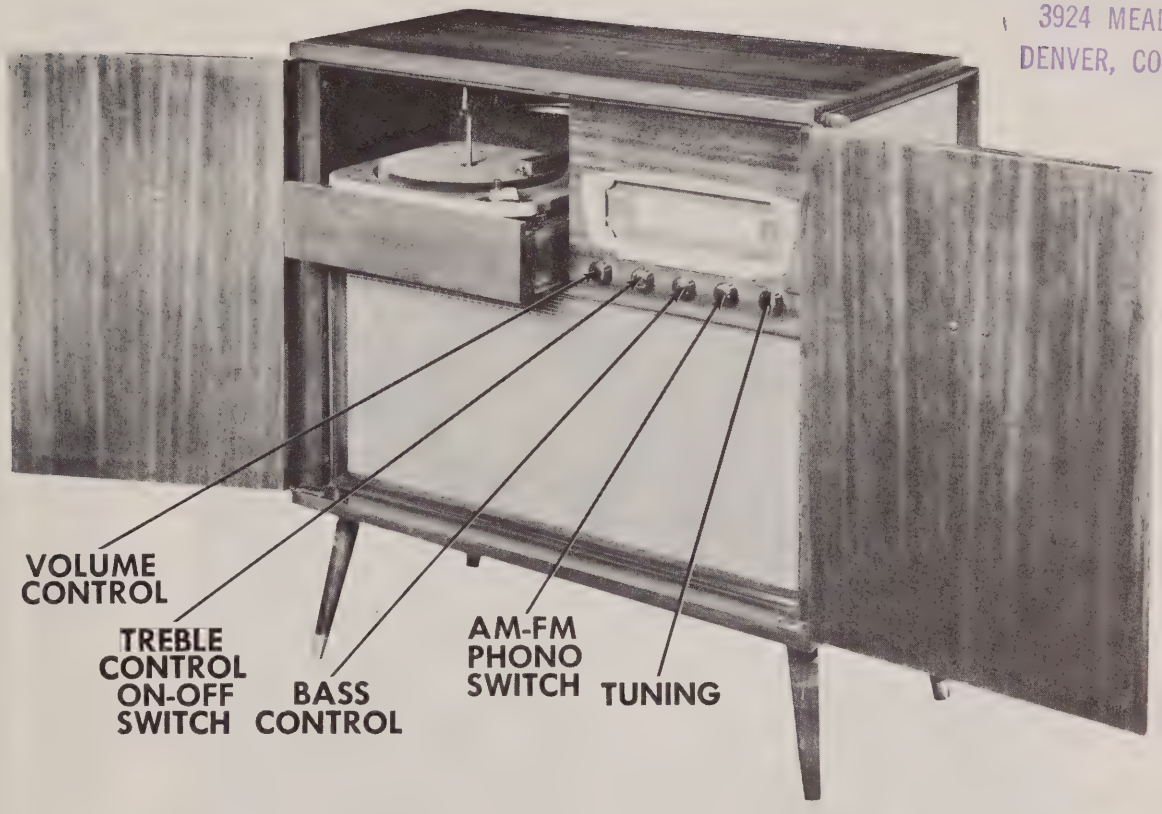
OLYMPIC
MODELS 505, B



OLYMPIC
MODELS 505, B

TRADE NAME	Olympic Models 505, 505B		
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th. Ave., Long Island City 1, N.Y.		
TYPE SET	AC Operated AM-FM-Phono Combination Superheterodyne Receiver		
TUBES (Ten)	Types 6AG5 RF Amp., 6BE6 Conv., (2) 6BA6 IF Amp., 6AL5 Ratio Det., 6SQ7 AF Amp., 6SQ7 AM Det.-AVC-Phase Inv., (2) 6L6G Output, 5U4G Rectifier		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING	1.07 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535-1700KC	FREQ. MOD.	88-108MC

RECORD CHANGER UNIT - WEBSTER-CHICAGO MODEL 114

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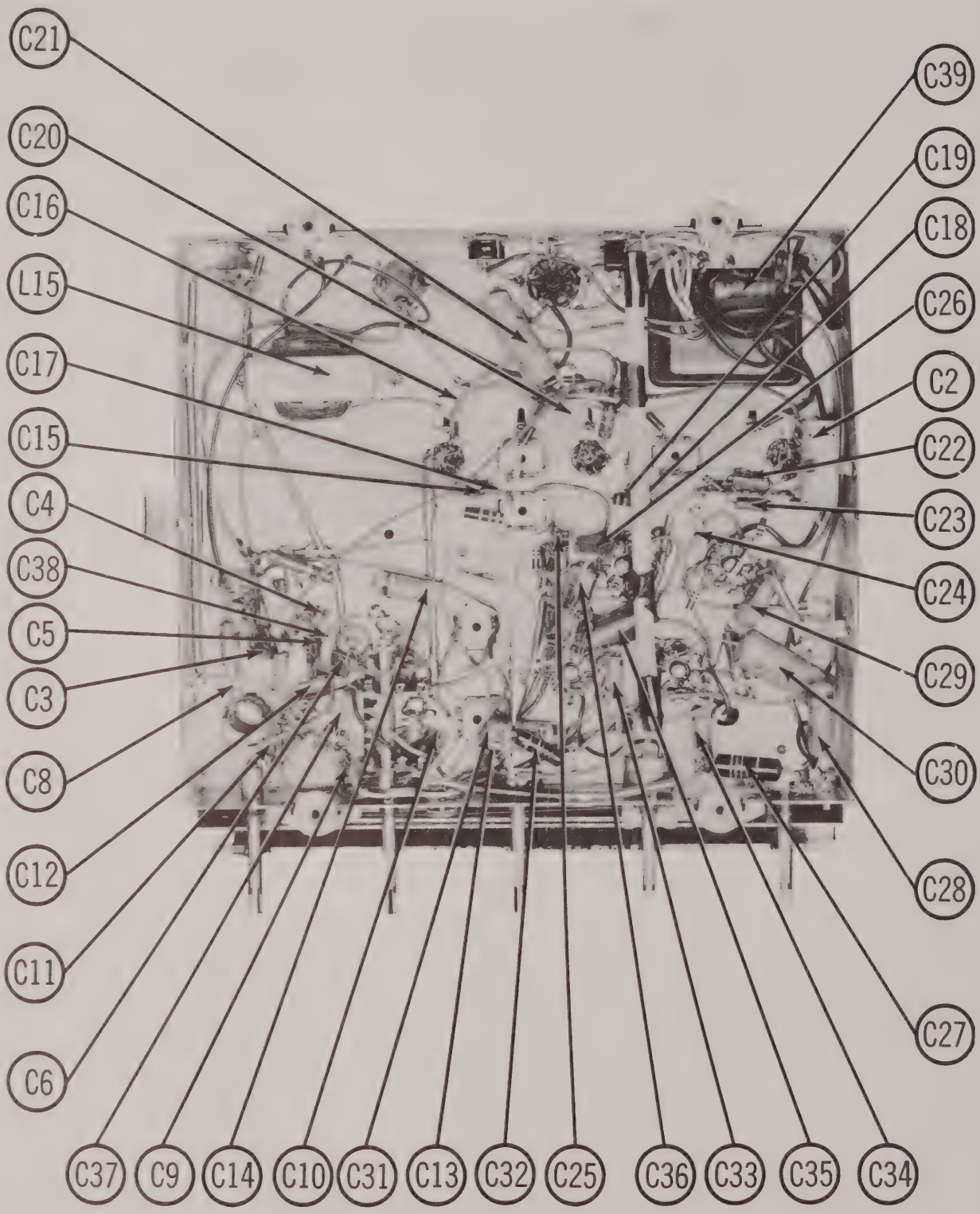
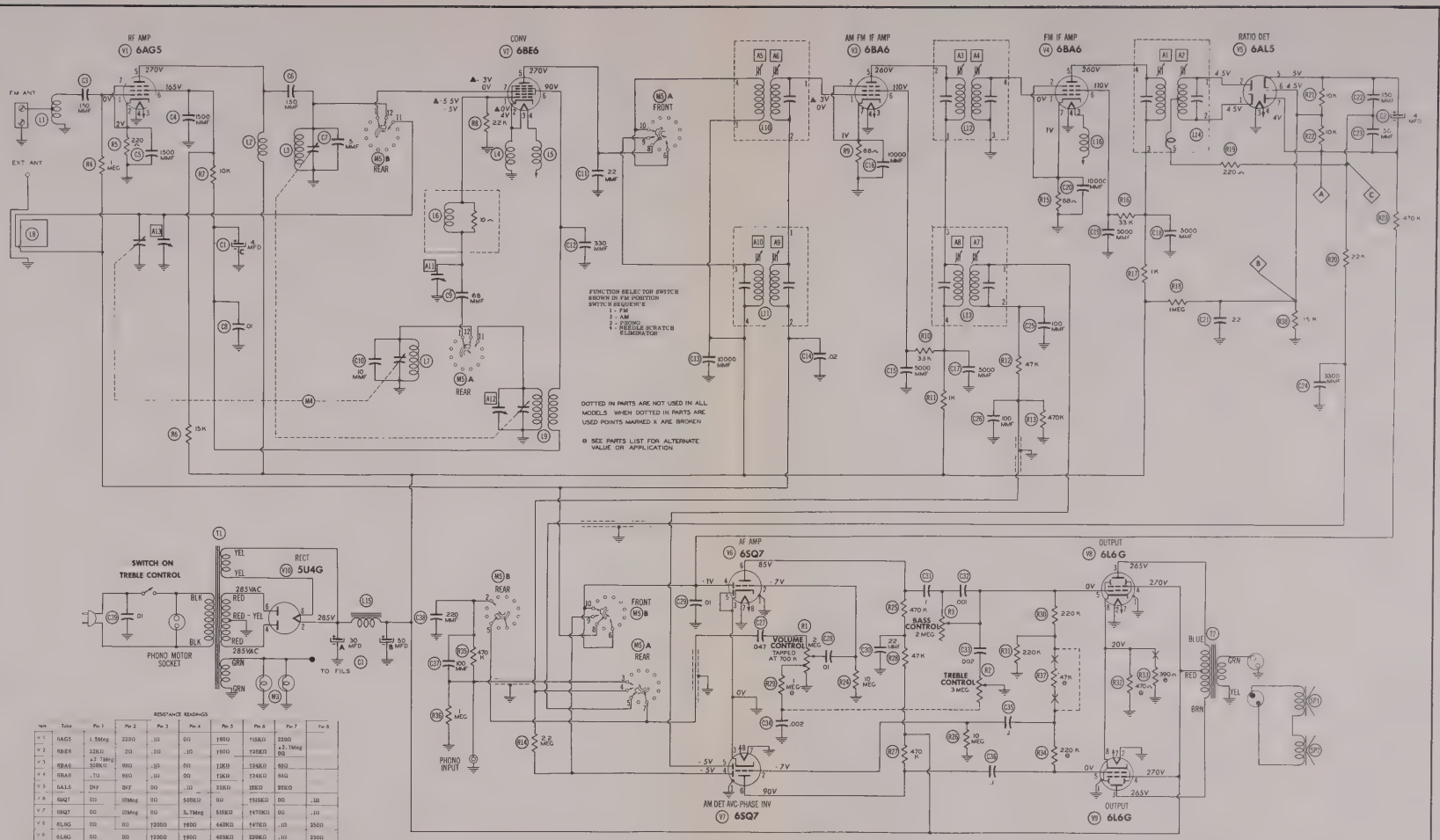


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
6AG5	1.5Meg	220Ω	.1Ω	0Ω	190Ω	135KΩ	220Ω	
6BE6	32KΩ	2Ω	.2Ω	.1Ω	190Ω	125KΩ	2.7Meg Ω	
6BA6	2.7Meg 500KΩ	68Ω	.1Ω	0Ω	11KΩ	124KΩ	68Ω	
6BA6	.7Ω	68Ω	.1Ω	0Ω	11KΩ	124KΩ	68Ω	
6AL5	INF	INF	0Ω	.1Ω	25KΩ	18KΩ	25KΩ	
6SQ7	0Ω	10Meg	0Ω	500KΩ	0Ω	135KΩ	0Ω	.1Ω
6SQ7	0Ω	10Meg	0Ω	2.7Meg	515KΩ	1470KΩ	0Ω	.1Ω
6L6G	0Ω	0Ω	1200Ω	190Ω	440KΩ	147KΩ	.1Ω	250Ω
6L6G	0Ω	0Ω	1200Ω	190Ω	485KΩ	220KΩ	.1Ω	250Ω
5U4G	INF	30KΩ	INF	25Ω	INF	38Ω	INF	30KΩ

ALL READINGS TAKEN IN FM POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM PIN 2 OF V10
▲ MEASURED IN AM POSITION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

AMIF=455KC
FMIF=10.7MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

259-10

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning gang fully closed set dial pointer to coincide with the gold index line at low frequency end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	DC probe to point (A). Common to point B.	A1	Adjust for maximum deflection.
2.	"	"	"	"	"	DC probe to point (C). Common to point (B).	A2	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
3.		Across ends of a two turn loop around 6BE6 (V2) envelope.	"	"	"	DC probe to point (A). Common to point (B).	A3, A4, A5, A6	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (450KC Swp)	FM	Tuning gang fully open	Vert. Amp. to point (A). Low side to chassis.	A1	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.		Across ends of a two turn loop around 6BE6 (V2) envelope	"	"	"	"	A3, A4, A5, A6	"
3.		"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A2	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of cross over lines.

AM IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4.	.1MFD	High side to antenna stator lug on tuning gang. Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A7, A8 A9, A10	Adjust for maximum deflection.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Two 150Ω Carbon Resistors	High side thru 150Ω to ungrounded FM antenna terminal. Low side thru 150Ω to grounded FM antenna terminal.	88MC (Unmod)	FM	88MC	DC probe to point (A). Common to point B.	L7	Adjust for maximum deflection by compressing or expanding coil turns.
6.	"	"	108MC	"	108MC	"	A11	Adjust for maximum deflection. Repeat steps 5 and 6 until proper oscillator tracking is obtained.
7.	"	"	98MC	"	Tune to 98MC signal	"	L1, L3	Adjust for maximum deflection by compressing or expanding coil turns.

AM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
8.		Loop	1500KC	AM	1500KC	Across voice coil	A12 A13	Adjust for maximum output.
9.		"	600KC	"	Tune to 600KC signal	"		If necessary, bend slotted antenna rotor plates for maximum output.

FIG. 1

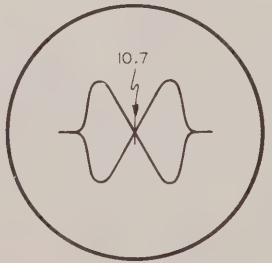


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		OLYMPIC PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6AG5	6AG5	7BD	
V2	Converter	6BE6	6BE6	7CH	
V3	AM FM IF Amp.	6BA6	6BA6	7BK	
V4	FM IF Amp.	6BA6	6BA6	7BK	
V5	Ratio Det.	6AL5	6AL5	6BT	
V6	AF Amplifier	6SQ7	6SQ7	8Q	
V7	AM Detector-AVC-Phase Inv.	6SQ7	6SQ7	8Q	
V8	Output	6L6G	6L6G	7S	
V9	Output	6L6G	6L6G	7S	
V10	Rectifier	5U4G	5U4G	5T	

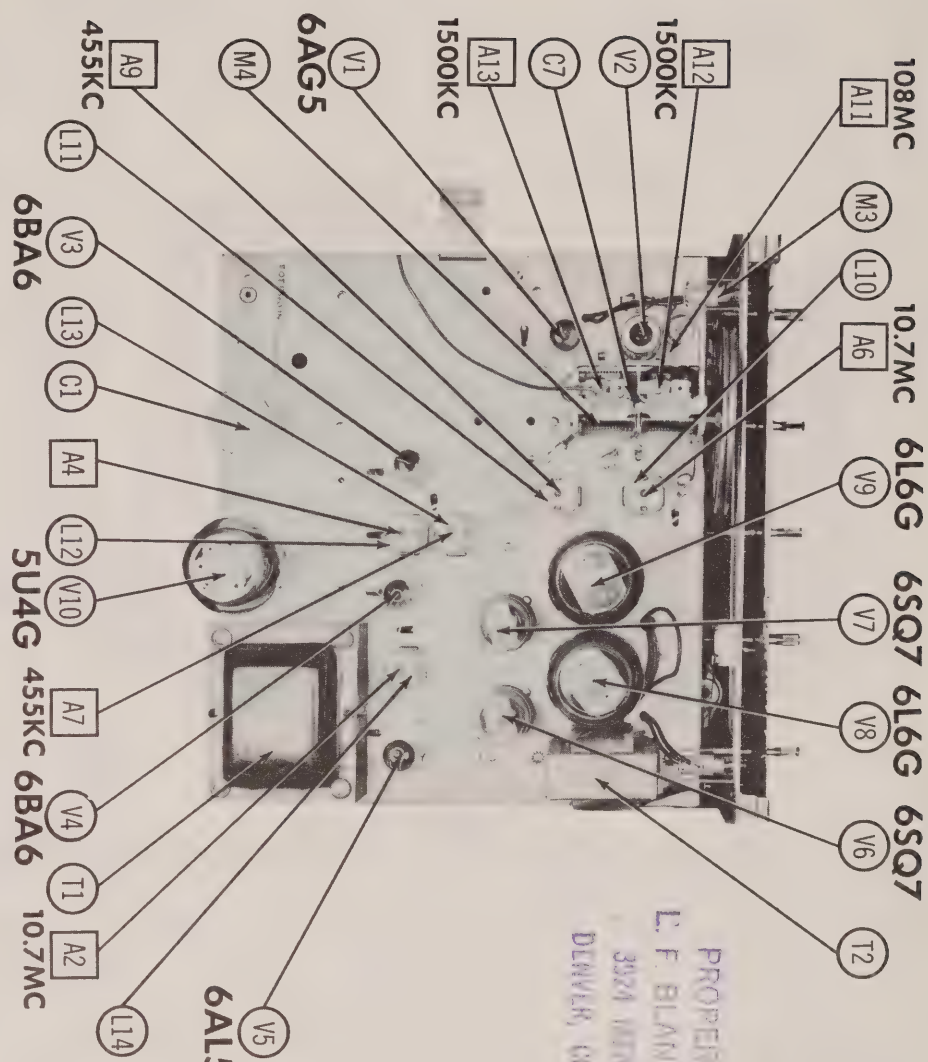
CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲30	400	C02350	AFH3-43		D015		FP239	TVL-4813	
B	■50	400						TC70		
C	▲4	400								
C2	4	450	C01056	PRS450/4		BR445		TC70	TVA-1701	
C3	150	500		1468-00015		5W5T15		MC B236	1FM-315	
C4	1500		CCR152-X	BPD-0015	DD-152	K071	801-0015	DC-5215	5GA-T15	
C5	1500		CCR152-X	BPD-0015	DD-152	K071	801-0015	DC-5215	5GA-T15	
C6	150	500		1468-00015		5W5T15		MCB236	1FM-315	
C7	5		C0183	SI5	D6-050	TP06	GP1K-050	ZT-555	5GA-V5	
V8	.01	600	C0B-6103	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C9	68	500	RCM20A680K	1468-00007		5W5Q68			MS-47	
C10	10	500	RCM20A100M	1468-000001		5W5Q1		MCB215	MS-41	
C11	22	500	RCM20C220K	1468-000025		5W5Q22			MS-42	
C12	330	500	RCM20A331M	1468-00035		5W5T33		MCB241	1FM-335	
C13	10000		CCD103-X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C14	.02	400		P488-02	DF-203	CUB4S2		PT412	4TM-S2	
C15	5000		CCD502-X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C16	10000		CCD103-X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C17	5000		CCD502-X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C18	5000		CCD502-X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C19	5000		CCD502-X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C20	10000		CCD103-X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C21	.22	200	C0H-2224	P288-22		PJ2P22		PT4022	2TM-P22	
C22	150	500	RCM20A151M	1468-00015		5W5T15		MCB236	1FM-315	
C23	150	500	RCM20A151M	1468-00015		5W5T15		MCB236	1FM-315	
C24	3300		CCA332-M	SI3300	D6-332	TP61	GP2-333-332	UC-5233	5GA-D33	
C25	100	500	RCM20A101M	1468-0001		5W5T1		MCB235	1FM-31	
C26	100	500	RCM20A101M	1468-0001		5W5T1		MCB235	1FM-31	
C27	.047	400	C0H-4473	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C28	.01	600	C0B-6103	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C29	.01	600	C0B-6103	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C30	.22	400	C0H-4203	P488-22		CUB4S22		PT4022	4TM-P22	
C31	.1	400	C0H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C32	.001	600	C0H-6102	P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C33	.002	600	C0H-6202	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C34	.002	600	C0H-6202	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C35	.1	400	C0H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C36	.1	400	C0H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C37	100	500		1468-0001		5W5T1		MCB235	1FM-31	
C38	220	500		1468-00025		5W5T22		MCB240	1FM-325	
C39	.01	600	C0B-6103	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	PT-567	Q13-139X	AT-115	ABT-80	UT-449	Volume - tapped @ 700KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	3Meg	½	PT-2160		A47-3Meg-Z	AB-85	U-57	Treble
B	Shaft		Not Req.		KSS-3	AK-4	Not Req.	Attach to R2A
C	Switch		Not Req.		SWE-12	KB-3	US-28	Attach to R2A
R3A	2Meg	½	PT-567	Q13-139X	AT-115	ABT-80	UT-449	Bass
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A

CHASSIS—TOP VIEW



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3324 MERRIOT ST
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA OLYMPIC PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	1Meg	½		BTS-1Meg	
R5	220Ω	½		BTS-220	
R6	15KΩ	2		BTB-15K	
R7	10KΩ	1		BTA-10K	
R8	22KΩ	½		BTS-22K	
R9	68Ω	½		BTS-68	
R10	33KΩ	1		BTA-33K	
R11	1000Ω	½		BTS-1000	
R12	47KΩ	½		BTS-47K	
R13	470KΩ	½		BTS-470K	
R14	2.2Meg	½		BTS-2.2Meg	
R15	68Ω	½		BTS-68	
R16	33KΩ	1		BTA-33K	
R17	1000Ω	½		BTS-1000	
R18	1Meg	½		BTS-1Meg	
R19	220Ω	½		BTS-220	
R20	22KΩ	½		BTS-22K	
R21	10KΩ	½		BTS-10K	
R22	10KΩ	½		BTS-10K	
R23	470KΩ	½		BTS-470K	
R24	10Meg	½		BTS-10Meg	
R25	470KΩ	½		BTS-470K	
R26	10Meg	½		BTS-10Meg	
R27	470KΩ	½		BTS-470K	
R28	47KΩ	½		BTS-47K	
R29	1Meg	½		BTS-1Meg	Note 4
R30	220KΩ	½		BTS-220K	
R31	220KΩ	½		BTS-220K	
R32	470Ω	2			Note 1
R33	390Ω	2			Note 1
R34	220KΩ	½		BTS-220K	Note 2
R35	470KΩ	½		BTS-470K	
R36	1Meg	½		BTS-1Meg	
R37	47KΩ	½		BTS-47K	Note 3
R38	15KΩ	½		BTS-15K	

Note 1. Some models may use a single 220Ω 5 watt resistor in this application.
Note 2. Some models may use a 270KΩ resistor in this application.
Note 3. Not used in all models.
Note 4. Some models may use a 220KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA OLYMPIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @1.07A	580VCT @.150A	5VAC @3A	6.3VAC @4.1A	TR-3196					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA OLYMPIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	5.8KΩ CT	7.8Ω	TR-3170	A-3830	A-2935	S-57Z	Z1011	22S74 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA OLYMPIC PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3.9Ω	SK3279	12J11	12A31	
SP2	12"	PM	3.9Ω	SK3279	12J11	12A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		CL2178				Tapped
L2	FM RF Choke	2.8Ω		CK2446	19-1003		4608	4.7 Microhenries, IRC part #CL-1
L3	FM RF Coil	0Ω		CL2179				
L4	Fil. Choke	.22Ω		CK2447	19-1000		4602	47 Microhenries, IRC part #CLA
L5	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries, IRC part CLA
L6	Parasitic Suppressor	0Ω						2 Turns #20 bare wire-wound on 10Ω resistor
L7	FM Osc.Coil	0Ω		CL2179				
L8	AM Loop Ant.	.1Ω	1.1Ω	LP2176				
L9	AM Osc.Coil	.4Ω	6Ω	CL1466	14-1074	BC-397 *	5480-C*	
L10	1st. FM IF	.7Ω	.7Ω	TR2180	16-3487	FM-254	1463	
L11	AM Input	14Ω	14Ω	TR1644	16-6758	BC-352	12-C1	
L12	2nd. FM IF	.7Ω	.7Ω	TR1643	16-3487	FM-254	1463	
L13	AM Output IF	9.5Ω	9.5Ω	TR1645	16-6758	BC-353	12-C2	
L14	Ratio Det.	1.5Ω	.9ΩCT	TR1646	17-3488 ▲	FM-255	1465	Tertiary winding -.5Ω
L15	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries, IRC part #CLA

* Drill mounting hole.
▲ Cut out chassis hole and drill mounting holes.

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA OLYMPIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L15	.150A	60Ω	2.6 Hy.	CK1346	C-2325 ①	C-2991 ①	C-21X	C5026	26C43 ①

① Drill new mounting hole.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA OLYMPIC PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1		ACD-J	A-1 or A-3	W22AB	A65MG A62A	46T	0-1 or S-1 & 0-3	

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

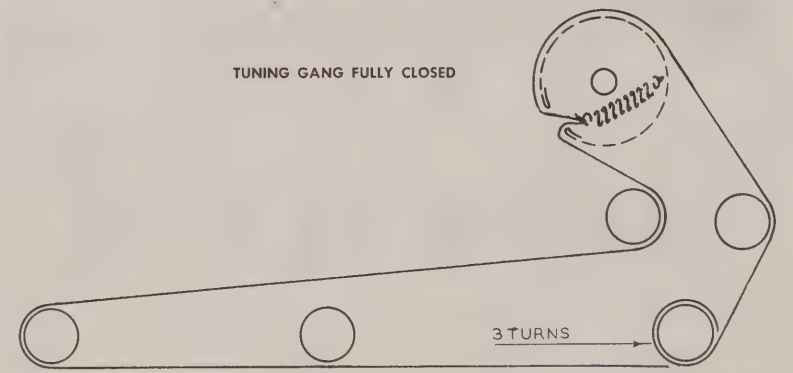
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA OLYMPIC PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		†JPS-30LP or *JP-30LP & *JP-30 or †JPS-30	*A-322 or †A-300 or ♦A-300D & *C-320 or †C-318 or ♦C-318D	†W-30MGS or *W-30MGA & *W-30A or †W-30S	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Dial Light	BU-187	#47 Bayonet (2 used)
M4	Tuning Cap.	CV-2165	29-525MMF, 22-195MMF
M5	Switch	SW-2159-1	FM-AM-Phono
	Knob	KN422	Walnut - Volume
	Knob	KN3163	Ivory - volume
	Knob	KN425	Walnut - Tuning
	Knob	KN3165	Ivory - Tuning
	Knob	KN3136	Walnut - Off-on-treble
	Knob	KN3437	Ivory - Off-on-treble
	Knob	KN3137	Walnut - Bass
	Knob	KN3438	Ivory - Bass
	Knob	KN-3360	Walnut - FM-AM-Phono
	Knob	KN3361	Ivory - FM-AM-Phono



DIAL CORD STRINGING

PROPERTY OF
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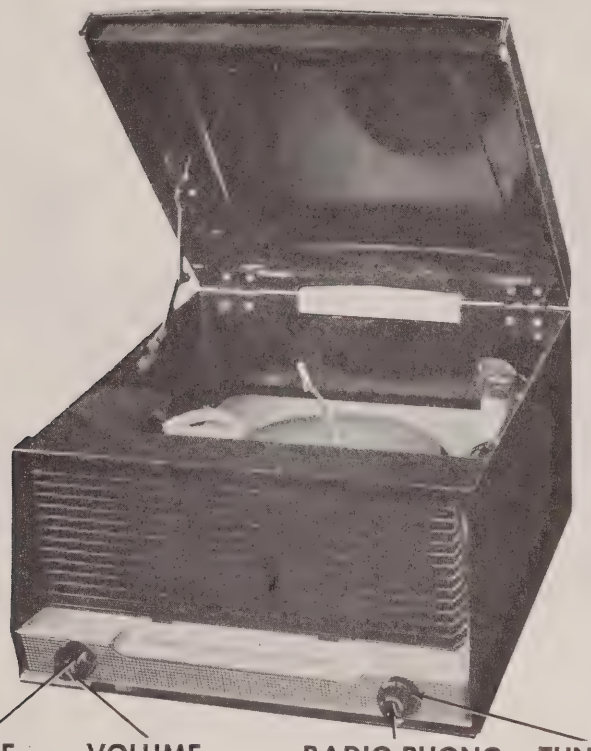
DENVER, COLORADO

PHILCO
MODELS B1349, C1348



PHILCO
MODELS B1349, C1348

TRADE NAME	Philco Models B1349, C1349
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Radio-Phono Combination Superheterodyne Receiver With 3 Speed Automatic Record Changer
TUBES (Five)	Types 7A8 Conv., 7B7 IF Amp., 7C6 Det.-AVC-AF Amp., 35L6GT Output, 50Y7GT Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles RATING .33 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set tone control to treble position.
It will be necessary to remove the front part of the cabinet to gain access to IF alignment adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 6 (grid) of 7A8 (V1). Low side to B-.	455KC (400%Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal	"	A6	"

RECORD CHANGER UNIT - PHILCO MODEL M-24

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1954 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

PHILCO MODEL B1349

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	7A8	7A8	8U	
V2	IF Amplifier	7B7	7B7	8V	
V3	Det.-AVC-AF Amp.	7C6	7C6	8W	
V4	Audio Output	35L6GT	35L6GT	7S	
V5	Rectifier	50Y7GT	50Y7GT	8AN	

CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	250	30-2575-41	E58C36		EDL4425C		3N535	R1323	Orange
B	40	250				BR4015		TC58		Red
C	40	150								Blue
D	25	25								Yellow
C2	20	150	45-3041	PRS150/20		BR2015		TC45	TVA-1410	
C3	.1	200	30-4650-47	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C4	4.7		30-1221-5	SI4.7NP0	TCZ-4.7	TZ07	NP0K-4R7	ZT-5547	5TCCB-V47	
C5	47		60-00475420	SI47	D6-470	TP29	GP1K-47	UC-5447	5GA-Q47	
C6	7.5		30-1224-65							
C7	.1	200	30-4650-47	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C8	.05	200	30-4650-45	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9	5000		30-1238-1	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C10	47		60-00475420	SI47	D6-470	TP29	GP1K-47	UC-5447	5GA-Q47	
C11	.0047	600	30-4650-56	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C12	5000		30-1238-1	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C13	.0047	600	30-4650-46	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C14A	250		♦30-6001	♦PA-112-1	♦PC-70	♦112TM1	♦1406-01		♦T-3	
B										
C	5000									
C15	.0047	600	30-4650-90	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C16	.04	400	30-4650-45	489ZX-04		PJ4S4		PT414	4TM-S4	
C17	.1	400	30-4650-47	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

♦ Items C14A, C14B, C14C, R12A and R12B are combined in one unit.
When replacing items individually items C14A, and C14B should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	5Meg	1/2	33-5563-55	*QJ-438	RTV-429			Tone - Panel
B	2Meg	1/2						Volume & Switch - Tapped @1.3Meg - Rear

* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS B12-141 & P1300 (Panel) B18-139X & R1-316 Rear SWITCH 76-1

RESISTORS

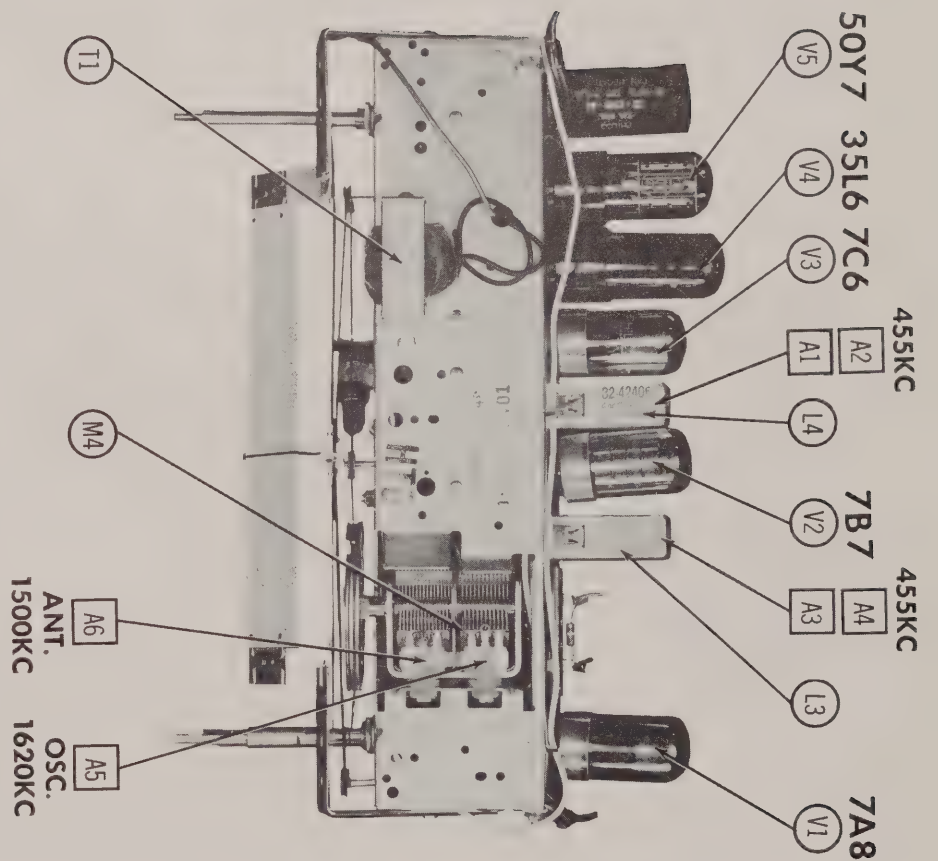
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	NOTES
R2	150KΩ	1/2	66-4158340	BTS-150K	
R3	100KΩ	1/2	66-4108340	BTS-100K	
R4	180Ω	1/2	66-1188340	BTS-180	
R5	27KΩ	1/2	66-3278340	BTS-27K	
R6	150KΩ	1/2	66-4158340	BTS-150K	
R7	470KΩ	1/2	66-4478340	BTS-470K	
R8	47KΩ	1/2	66-3478340	BTS-47K	
R9	2.2Meg	1/2	66-5228340	BTS-2.2Meg	
R10	10Meg	1/2	66-6108340	BTS-10Meg	
R11	68KΩ	1/2	66-3688340	BTS-68K	
R12A	500KΩ	1/2	♦30-6001		
B	500KΩ	1/2			
R13	180Ω	1	66-1184340	BTA-180	
R14	4700Ω	2	66-2475340	BTB-4700	
R15	270Ω	7	33-1335-91		
R16	100Ω		33-1343-3		Note

♦ Items R12A, R12B, C14A, C14B, C14C are combined in one unit.
Note. Tube Saver Resistor, 880Ω at room temperature, resistance drops to 100Ω as tubes heat up.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	4.8KΩ	3.4Ω	32-8242-11	A-3849	A-3019	S-5Z	Z1006	26S49	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5 1/4"	PM	3.4Ω	36-1639-1	ST-303 P525-V	52A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.6Ω		76-2127-16				
L2	Osc. Coil	1.4Ω	6.5Ω	32-4574-4	14-1074	BC-381	71-Osc.	
L3	Input IF	12Ω	12Ω	32-4160A	16-6758	BC-352	12-C1	
L4	Output IF	15Ω	15Ω	32-4240A	16-6770	BC-355	12-C6	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	PHILCO PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	45-9612							

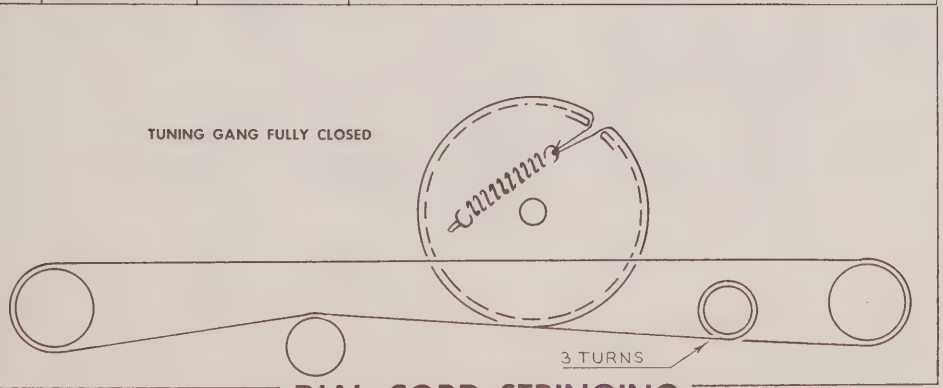
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	PHILCO PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	45-9588	*PH-12 or †PH-13	*AC-315 or †*AC-313 or ♦*AC-313D3	*W-46TPA or † W-46TPS	* Metal † Jewel ♦ Diamond

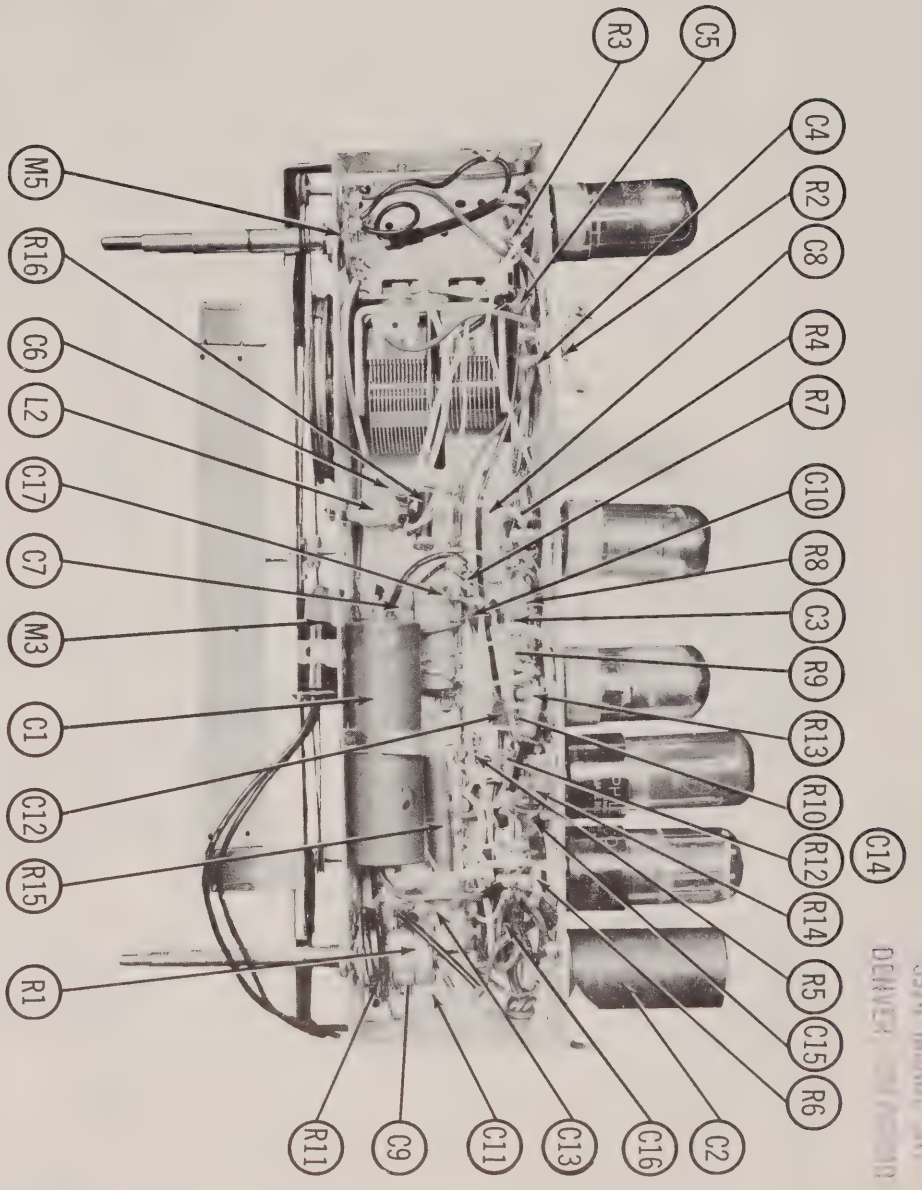
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Dial Light	34-2064	Bayonet #44
M4	Tuning Cap.	31-2751-10	19-462MMF, 19-163MMF
M5	Switch	42-1949-2	Phono-Radio
	Cabinet	10949-2	Mahogany Mottle
	Knob	54-4842-8	Off/on/volume
	Knob	54-4842	Radio-Phono
	Knob	54-4841	Tuning
	Knob	54-4841-10	Tone
	Pointer Rail	76-7906	Tuning
	Pointer	56-5630-50	Tuning
	Dial Scale	54-5156-1	



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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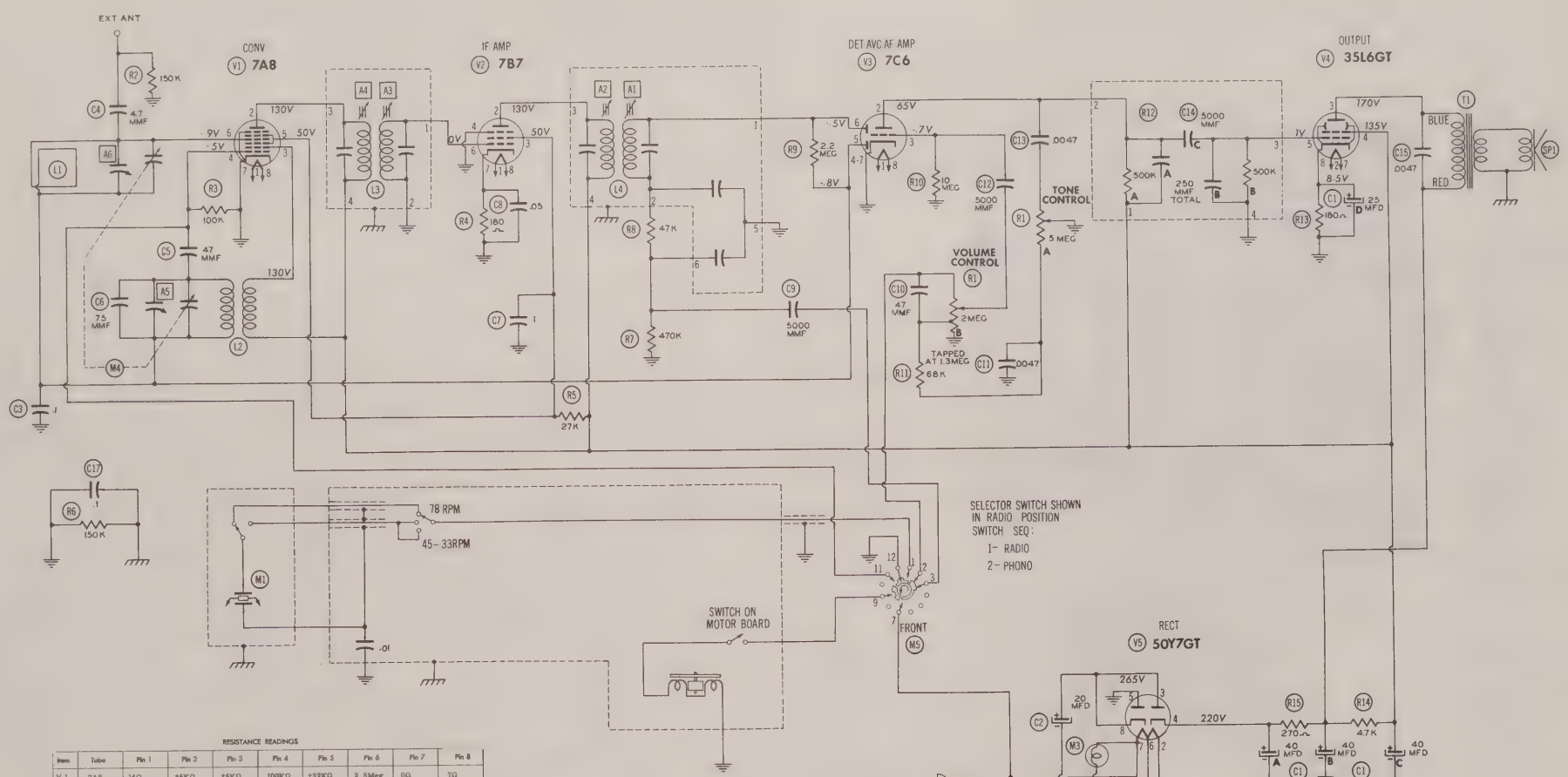
DENVER

PHILCO MODEL B1349



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	7A8	14Ω	†5KΩ	†5KΩ	100KΩ	†32KΩ	2.5Meg	0Ω	7Ω
V 2	7B7	22Ω	†5KΩ	†32KΩ	0Ω	0Ω	12Ω	180Ω	14Ω
V 3	7C6	7Ω	†505KΩ	10Meg	0Ω	2.5Meg	510KΩ	0Ω	0Ω
V 4	35L6GT	†270Ω	700Ω	†700Ω	†5KΩ	500KΩ	†5KΩ	650Ω	180Ω
V 5	50Y7GT	800Ω	700Ω	200KΩ	200KΩ	0Ω	800Ω	800Ω	200KΩ

† MEASURED FROM PIN 4 OF V5

IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

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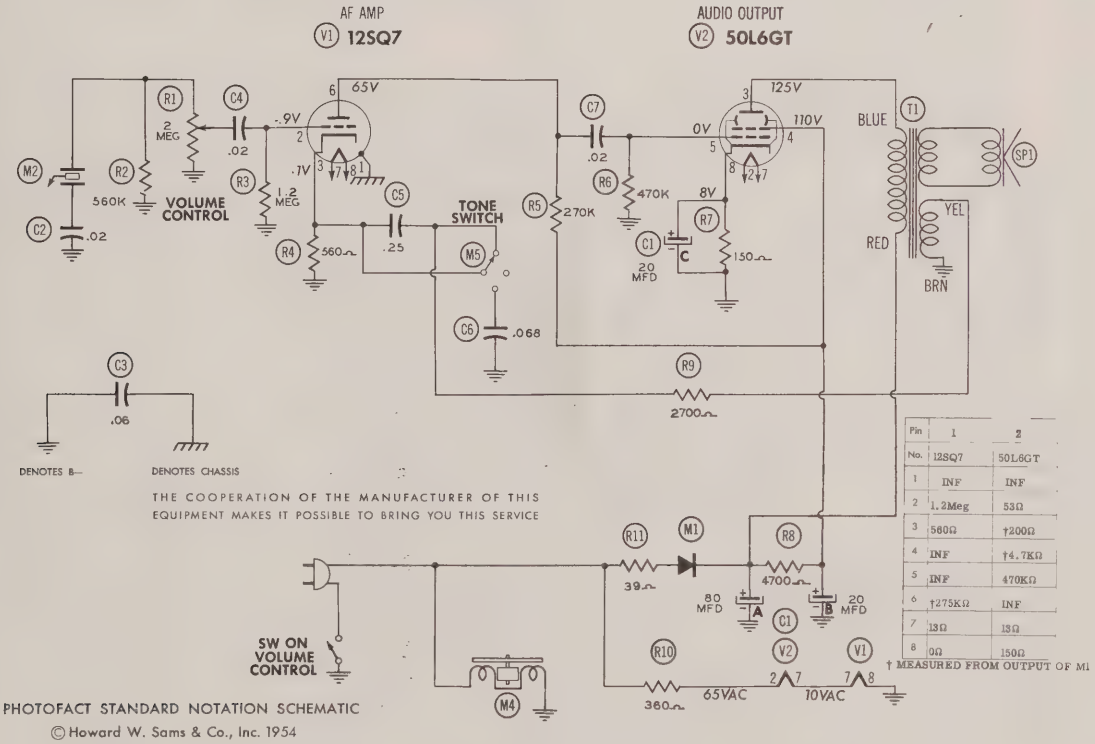
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PHONOLA
MODELS TK2146, -2

TRADE NAME	Phonola Models TK2146, TK2146-2
MANUFACTURER	Water-Conley Co., Rochester, Minn.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (Two)	Types 12SQ7 AF Amp., 50L6GT Audio Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC



Pin No.	1 12SQ7	2 50L6GT
1	INF	INF
2	1.2Meg	53Ω
3	560Ω	†200Ω
4	INF	†4.7KΩ
5	INF	470KΩ
6	†275KΩ	INF
7	13Ω	13Ω
8	0Ω	150Ω

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: PHONOLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amplifier	12SQ7	12SQ7	8Q	
V2	Audio Output	50L6GT	50L6GT	7S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHONOLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	10427	PRS150/80-40-20		BBRT8415C		3N538	TVA-3455	Blue
B	20	150								Red
C	20	25								Yellow
C2	.02	200	10497	P288-02		PJ2S2		PT412	2TM-S2	
C3	.06	200	10502	P288-06		PJ2S6		PT416	2TM-S6	
C4	.02	200	10497	P288-02		PJ2S2		PT412	2TM-S2	
C5	.25	200	10858	P288-25		PJ2P25		PT4025	2TM-P25	
C6	.068	200		P688-068		CUB6D68		PT6268	6TM-D68	Note 1
C7	.02	200	10497	P288-02		PJ2S2		PT412	2TM-S2	

Note 1. Some models may use a .15MFD @ 200V in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHONOLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	10496	Q13-139	A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHONOLA PART No.	IRC PART No.	NOTES
R2	560KΩ	½	8842	BTS-560K	
R3	1.2Meg	½	9893	BTS-1.2Meg	
R4	560Ω 5%	½	10921	BTS-560 5%	
R5	270KΩ	½	8841	BTS-270K	
R6	470KΩ	½	10305	BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHONOLA PART No.	IRC PART No.	NOTES
R7	150Ω	½	9897	BTS-150	
R8	4700Ω	½	10429	BTS-4700	
R9	2700Ω	½	10899	BTS-2700	
R10	360Ω 5%	10	10584		
R11	39Ω	½	10428	BTS-39	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC. 1	REPLACEMENT DATA: PHONOLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.3KΩ	3Ω SEC. 2 1.1Ω RES	10859						

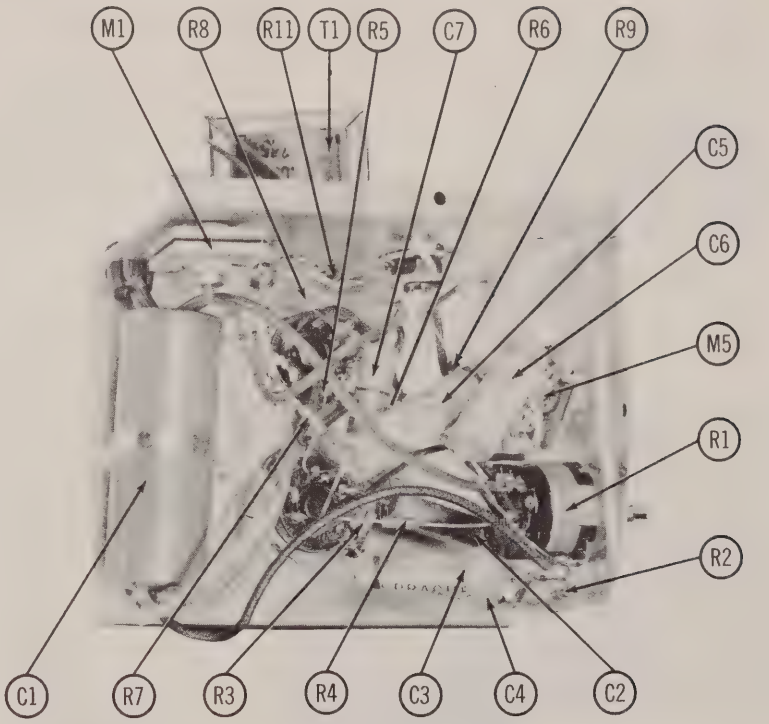
SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: PHONOLA PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	3Ω	10901	ST-803 Mod. P525-V	52A1	

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: PHONOLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.057A	10432	1263A	RS65	6S65	65	5M4	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: PHONOLA PART No.	ASTATIC PART No.: CARTRIDGE	ASTATIC PART No.: NEEDLE	SHURE PART No.: CARTRIDGE	SHURE PART No.: NEEDLE	ELECTRO-VOICE PART No.: CARTRIDGE	ELECTRO-VOICE PART No.: NEEDLE	REMARKS
M2	10906	53-2	G-AG			*2443		* Complete tone arm and cartridge assembly

ASTATIC LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEEMENT SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA: PHONOLA PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M3	10637	†S-642 or *S-652	*B-326 or †B-334 or ♦B-334D	*W-3AGA or †W-3AGS	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	PHONOLA PART No.	NOTES
M4A	Motor	10881	TK2146
B	Motor	10932	TK2146-2
M5	Switch	10879	Tone Selector
	Knob	10903	2 used

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DENVER, COLORADO

RCA VICTOR MODEL
4X641 (Ch. RC1140)

RCA VICTOR MODEL
4X641 (Ch. RC1140)

TRADE NAME	RCA Victor Model 4X641 (Ch. RC1140)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Six)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BA6 (V2). Low side to B-.	455KC (400~Mod)	600KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to "External Antenna" terminal. Low side to B-.	1620KC	Tuning gang fully open	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A6, A7	"
4.	"	"	600KC	Tune to 600KC signal	"	A8	Shunt RF trimmer (A6) with 22KΩ across terminals 3 and 5. Adjust for maximum output while rocking tuning gang thru 600KC signal.
5.	"	"	"	"	"	A9	Disconnect 22KΩ shunt. Adjust for maximum output. Repeat steps 3, 4 and 5.

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PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL 4X641 (Ch. RC1140)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amplifier	12BA6	12BA6	7BK	
V4	Det.-AVC-AF Amp	12AV6	12AV6	7BT	
V5	Audio Output	35C5	35C5	7CV	
V6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	75980	PRS150/80-40		BBRD8415		TCD498	TVA-3455	Red Green
B	50	150								
C2	3.3		71503	SI3.3NP0	TCZ-3.3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C3	47		76348	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C4	2.2		71502	SI2.2NP0	TCZ-2.2	TZ05	NP0A-2R2		5TCCB-V22	
C5	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C6	47		76348	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C7	.1	400	78922	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C8A	220									
B	5000									
C	5000		♦79058	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C9	.0068	400	78854	P688-0068	D6-682	CUB6D68	GP2-333-682	PT6268	6TM-D68	
C10	.1	200	79251	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C11	.047	400	75071	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C12	.1	400	73551	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

♦ Items C8A, C8B, C8C, C8D, C8E, R8A, R8B, R8C are combined in one unit.
When replacing items separately, C8D and C8E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	79282	Q13-137	A47-1Meg-Z	B-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

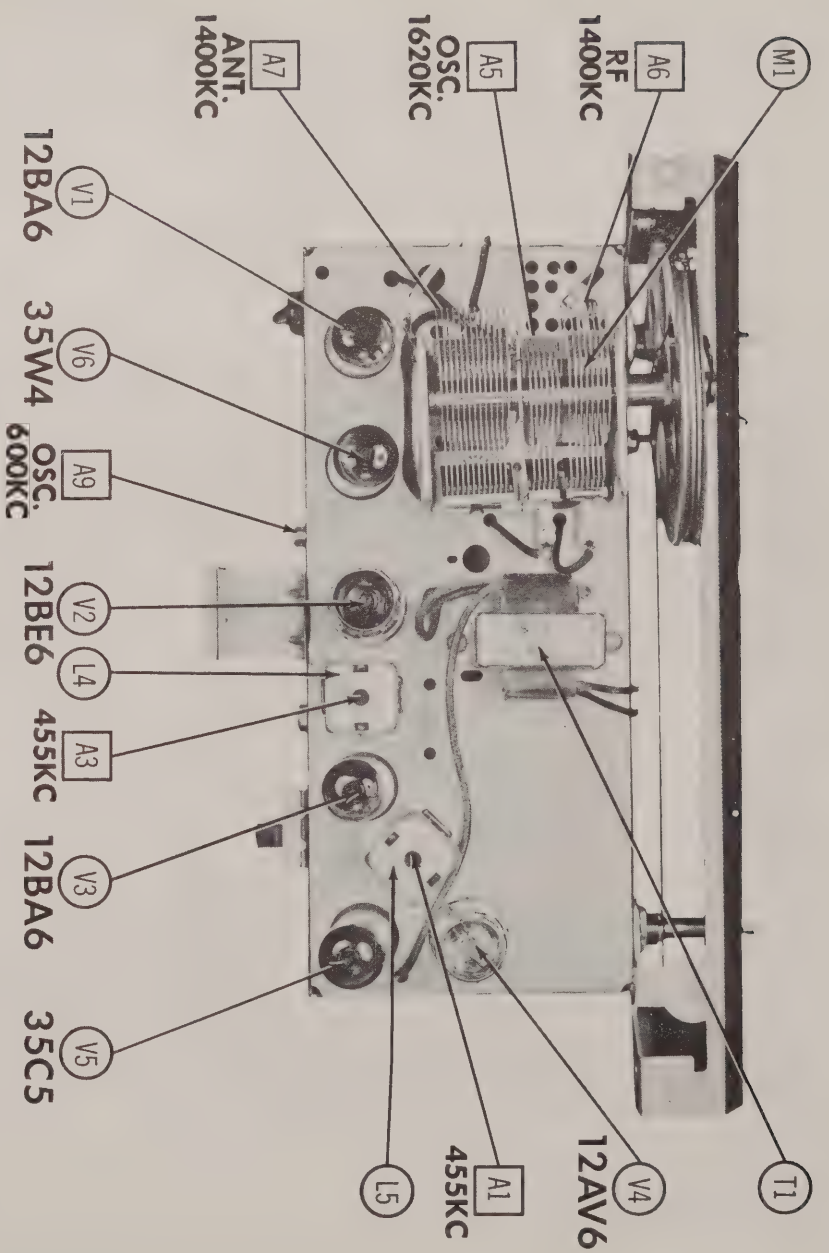
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	180Ω	½	503118	BTS-180	
R3	8200Ω	½	503282	BTS-8200	
R4	33KΩ	½	503333	BTS-33K	
R5	120Ω	½	503112	BTS-120	
R6	56KΩ	½	503356	BTS-56K	
R7	2.2Meg	½	503522	BTS-2.2Meg	
R8A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦79058	BTS-470K	
C	470KΩ	1		BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R9	150Ω	½	503115	BTS-150	
R10	1200Ω	1	513212	BTA-1200	
R11	1Meg	½	503510	BTS-1Meg	
R12	270Ω	½	503127	BTS-270	
R13	2700Ω	½	503227	BTS-2700	
R14	33Ω	1	513033	BTA-33	

♦ Items R8A, R8B, R8C, C8A, C8B, C8C, C8D, C8E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	3KΩ	3.5Ω	77517	A-3336 ①	A-3031 ①		Z1102 ①	24S50A ①	① Drill one new mounting hole.

SPEAKER

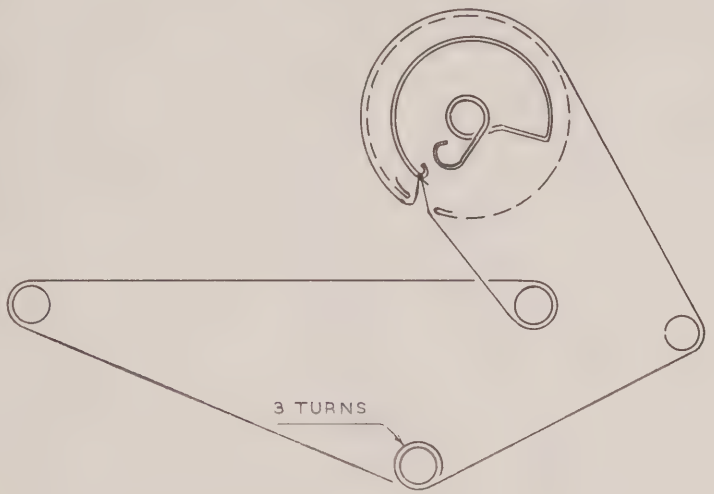
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	VIKING PART No.	QUAM PART No.	
SP1	4 x 6"	PM	3.5Ω	79292	46J6	46A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2Ω		79275				Includes cabinet back
L2	RF Coil	32Ω	5.5Ω *	73677				
L3	Osc. Coil	.7Ω	7.5Ω	79285	14-1027		71-Osc.	
L4	Input IF	18Ω	18Ω	75486	16-6758	BC-352	12-C1	
L5	Output IF	16Ω	15Ω	73037	16-6770	BC-355	12-C6	

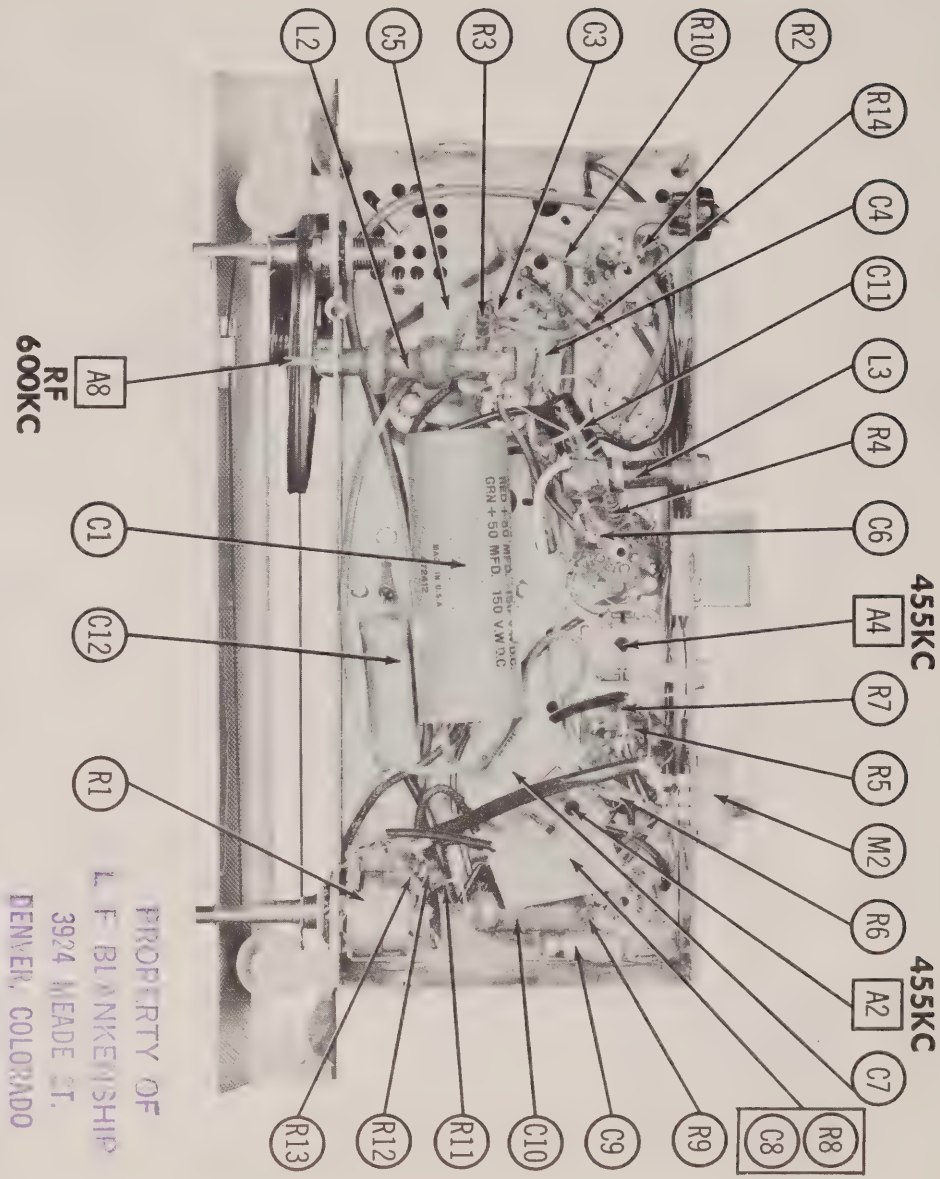
MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M1	Tuning Cap.	79287	28-400MMF, 17-230MMF, 16-103MMF
M2	Switch	79256	Radio-Phono
	Cabinet	42639	
	Knob	79269	On/off/volume & tuning
	Back Plate	79296	Dial
	Dial Pointer	79268	



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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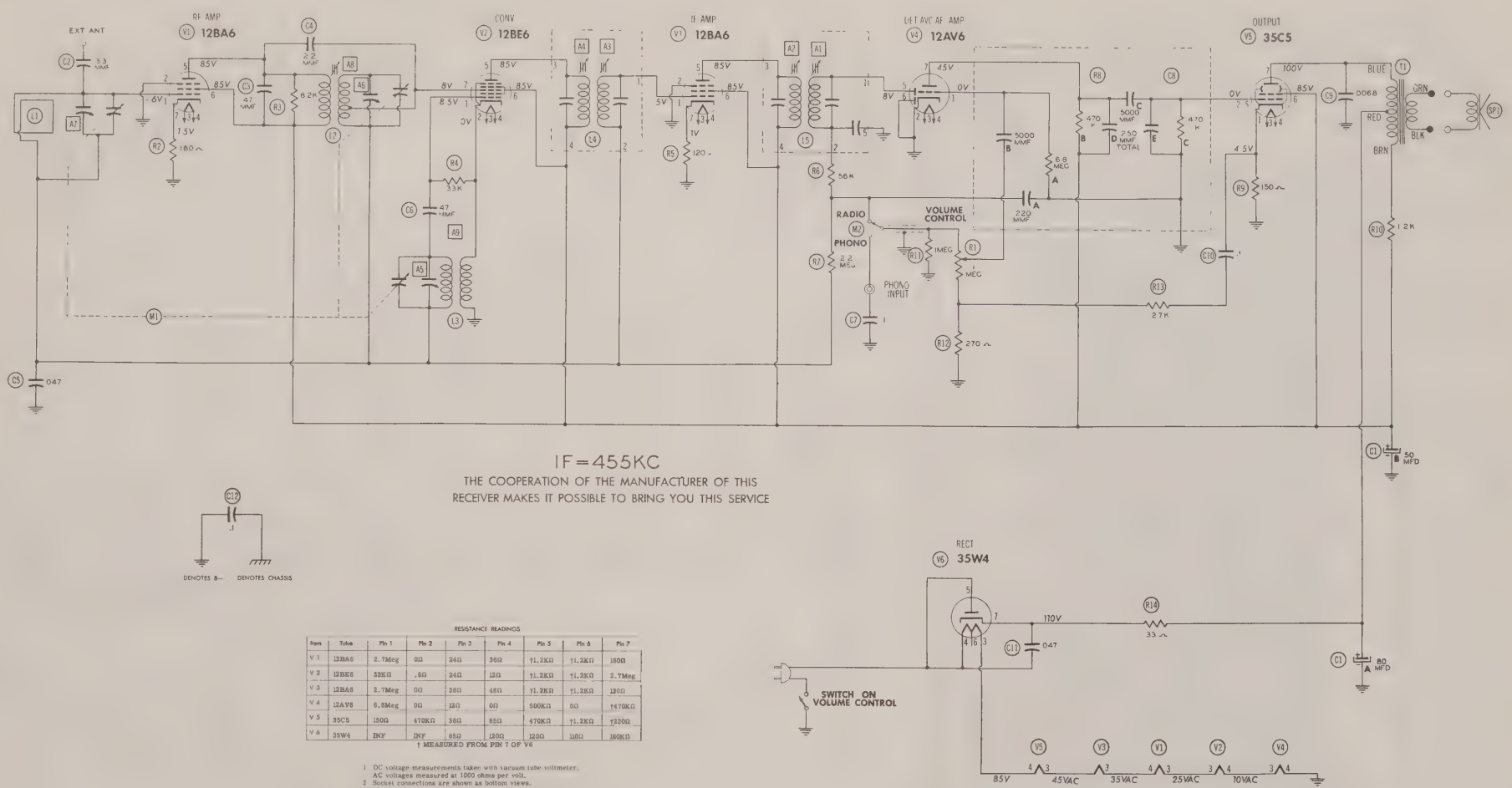
DENVER, COLORADO

RCA VICTOR
MODEL 4X641 (Ch. RC1140)



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	2.7Meg	0Ω	24Ω	36Ω	†1.2KΩ	†1.2KΩ	180Ω
V 2	12BE6	33KΩ	.8Ω	24Ω	12Ω	†1.2KΩ	†1.2KΩ	2.7Meg
V 3	12BA6	2.7Meg	0Ω	36Ω	48Ω	†1.2KΩ	†1.2KΩ	120Ω
V 4	12AV6	6.8Meg	0Ω	12Ω	0Ω	500KΩ	0Ω	†470KΩ
V 5	35C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	†1.2KΩ	†220Ω
V 6	35W4	INF	INF	85Ω	120Ω	120Ω	110Ω	180KΩ

† MEASURED FROM PIN 7 OF V6

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements

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3924 MEADE ST.
DENVER, COLORADO

STROMBERG-CARLSON
MODEL BP-1

STROMBERG-CARLSON
MODEL BP-1

TRADE NAME	Stromberg-Carlson Model BP-1
MANUFACTURER	Stromberg-Carlson Co., Service Dept., 302 N. Goodman St., Rochester, N.Y.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	1.5 Volts "A" Supply & 75 Volts "B" Supply
RATINGS	200MA @ 1.5 Volts DC & 8.5MA @ 75 Volts DC
TUNING RANGE—BROADCAST	540KC - 1625KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1625KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Stromberg-Carlson PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	10	100	111121	PRS150/12		BR1015		TC42	TVA-1406	
C2	.047	200	110703	P288-047	DF-503	PJ2S47		PT415	2TM-S47	
C3	47		110695	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C4	10000		110672	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	5.5		110655							
C6	.005	600	110419	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C7A	150					TP36	GP2K-151	UC-5315		
B	2000					K072	801-002	DC-522		
C	10000		♦128205	♦PA-136	♦PC-160	K082	811-01	DC-511	♦DP-1	
D	150					TP36	GP1K-151	UC-5315		
E	5000					K080	801-005	DC-525		
C8	2000		110840	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	

♦ Items C7A, C7B, C7C, C7D, C7E, R7A, R7B, R7C and R7D are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Stromberg-Carlson PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	145180	Q13-139	A47-2Meg-Z	B-76-S	U-55	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	100KΩ	½	149113	BTS-100K	
R3	15KΩ	1	149108	BTS-15K	
R4	10Meg	1½	149125	BTS-10Meg	
R5	4.7Meg	2	149123	BTS-4.7Meg	
R6	1000Ω	½	149101	BTS-1000	

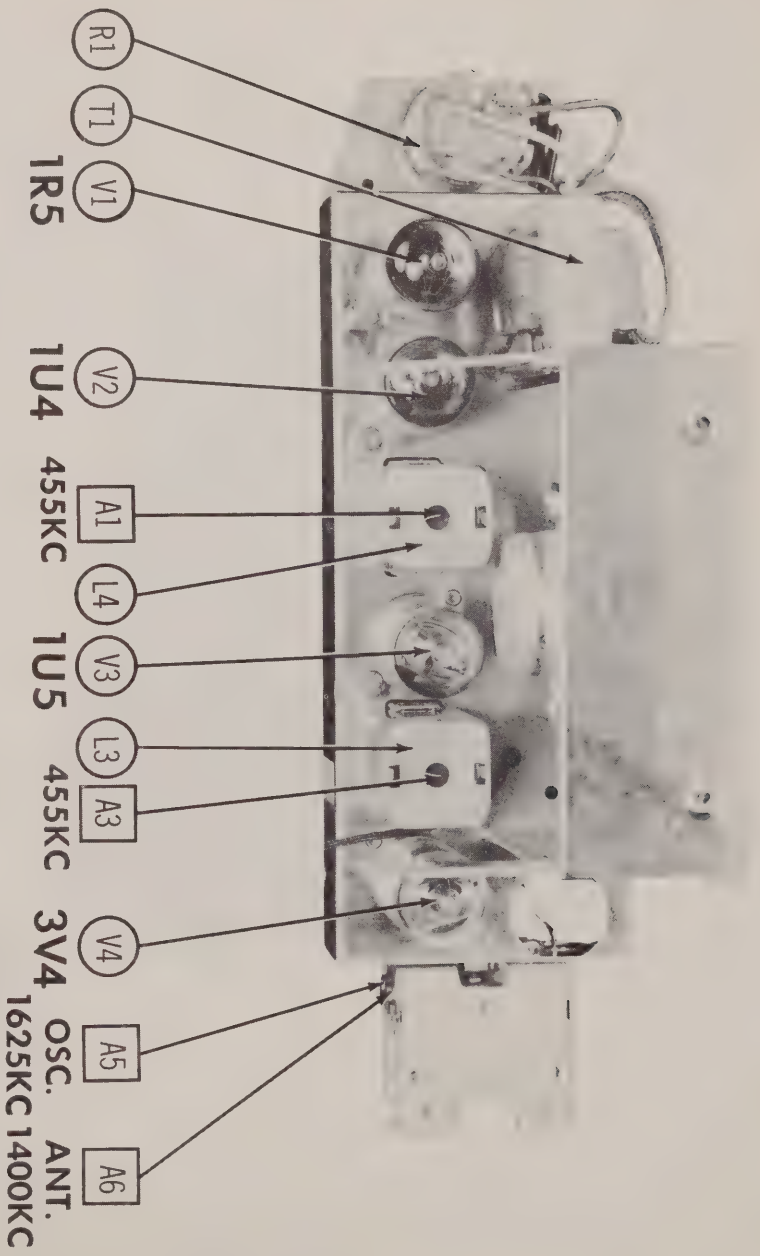
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7A	10Meg	½	♦128205	BTS-10Meg	
B	4.7Meg	1		BTS-4.7Meg	
C	1Meg	1½		BTS-1Meg	
D	3.3Meg	2		BTS-3.3Meg	
R8	390Ω	1	28153	BTS-390	
R9	430Ω	½	149467	BTS-470	

♦ Items R7A, R7B, R7C, R7D, C7A, C7B, C7C, C7D and C7E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Stromberg-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	9.8KΩ	3.3Ω	161272	A-3329	A-2927 ①	S-11X		24S49	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Stromberg-Carlson PART No.	VIKING PART No.	QUAM PART No.	
SP1	3½"	PM	3.3Ω	155887 155289 ①	35J6	5A07	① Alternate speaker

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1.2Ω		139060				
L2	Osc. Coil	1.4Ω	7Ω	114136	14-1074		70-Osc.	
L3	Input IF	24Ω	24Ω	114427	16-6758	BC-352	12-C1	
L4	Output IF	24Ω	24Ω	114427	16-6758	BC-353	12-C2	

BATTERIES

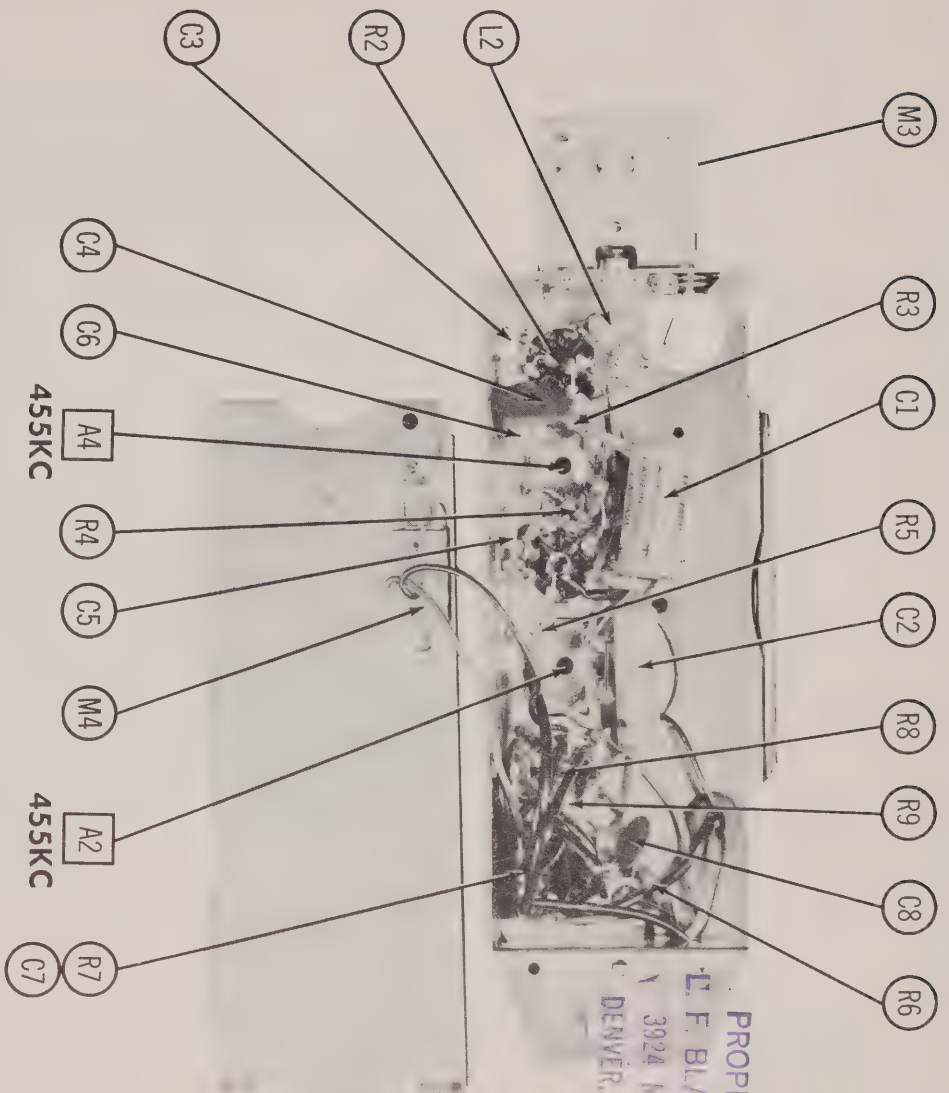
ITEM No.	VOLTAGE	Stromberg-Carlson PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V	141037 *	964			2IR			Connect 2 in parallel
M2	75V	141037 *		437			XX50		

* Stromberg-Carlson battery kit #10 - consists of M1 & M2

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M3	Tuning Cap.	110057	25-250MMF, 20-120MMF
M4	Switch	158052	Battery Saver
	Cabinet	108358	Jade Black
	Cabinet	108360	Spruce green
	Cabinet	108362	Suede brown
	Cabinet	108364	Lemon Peel
	Cabinet	108366	Terra Cotta
	Cabinet	108368	Antique white
	Knob	134235	2 used
	Handle	132242	

CHASSIS—BOTTOM VIEW



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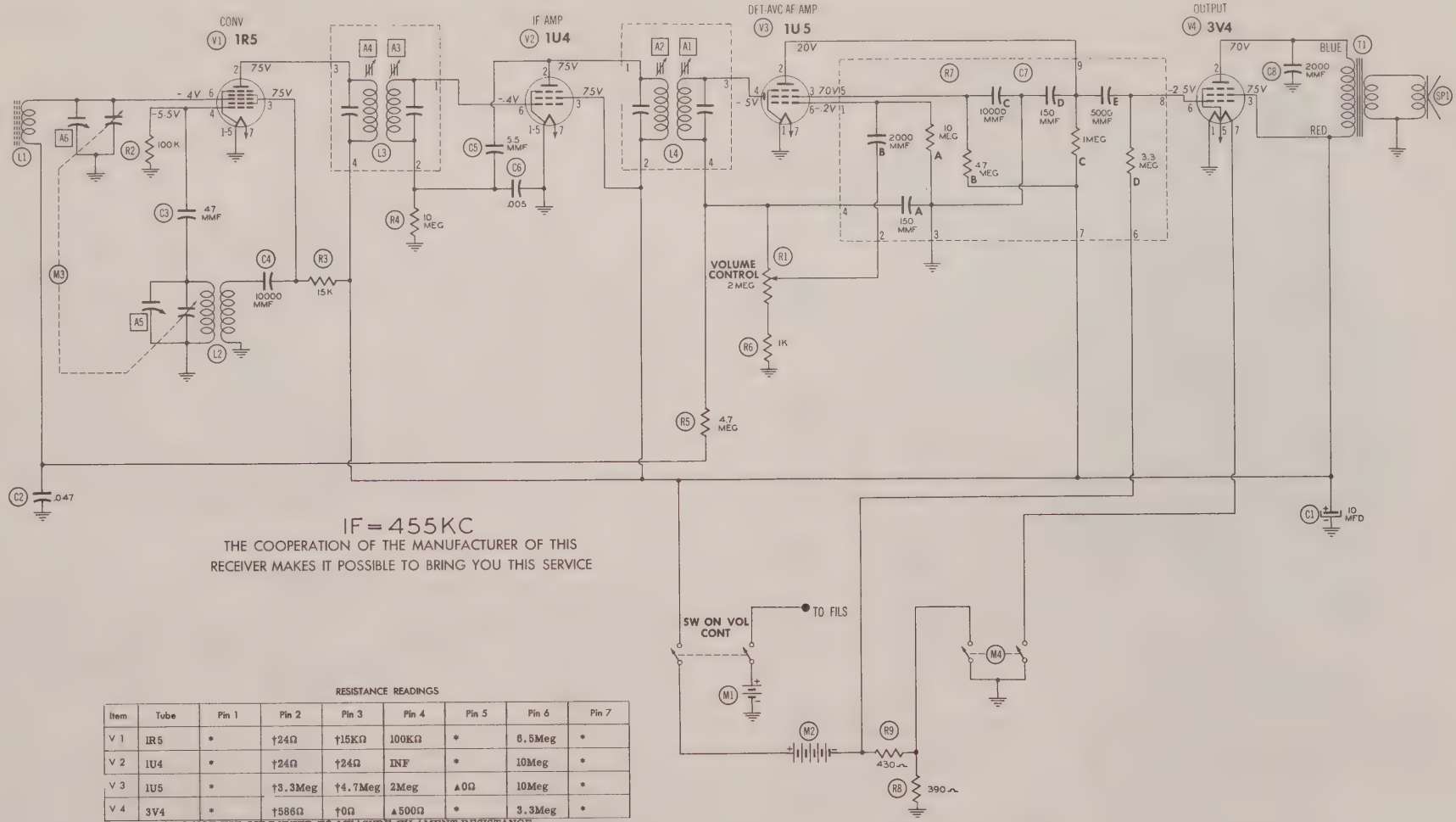
STROMBERG-CARLSON
MODEL BP-1



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†24Ω	†15KΩ	100KΩ	*	6.5Meg	*
V 2	1U4	*	†24Ω	†24Ω	INF	*	10Meg	*
V 3	1U5	*	†3.3Meg	†4.7Meg	2Meg	▲0Ω	10Meg	*
V 4	3V4	*	†586Ω	†0Ω	▲500Ω	*	3.3Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM POSITIVE TERMINAL OF CAPACITOR C1
▲ MEASURED WITH BATTERY SAVER SWITCH IN "MAXIMUM POWER" POSITION

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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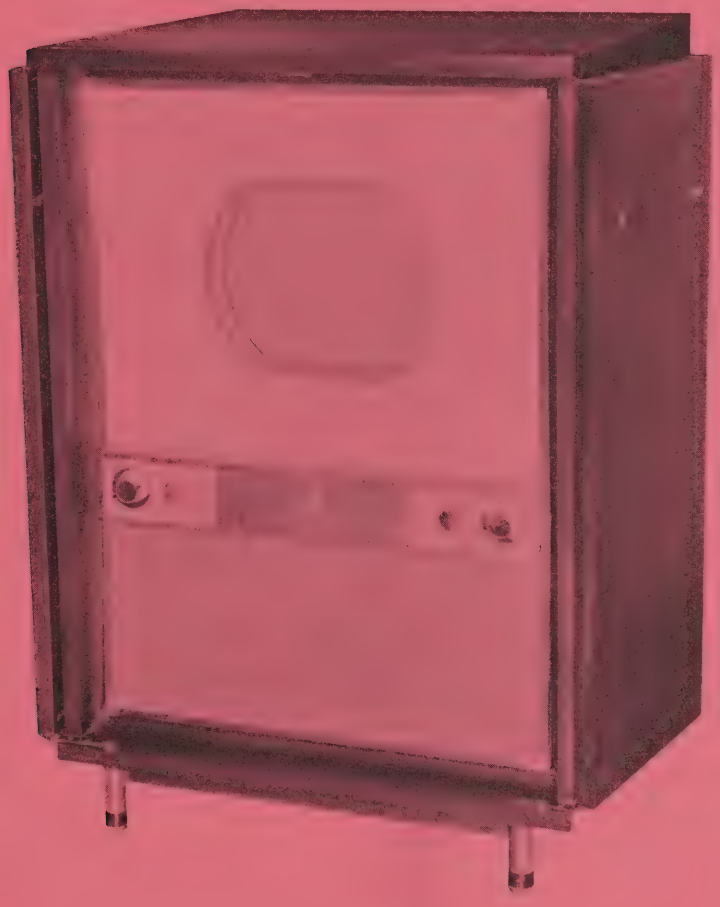

MODEL H-840CK15

WESTINGHOUSE
MODEL H-840CK15 (Ch. V-2284-15)

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DATE 12-54 SET 259 FOLDER 15

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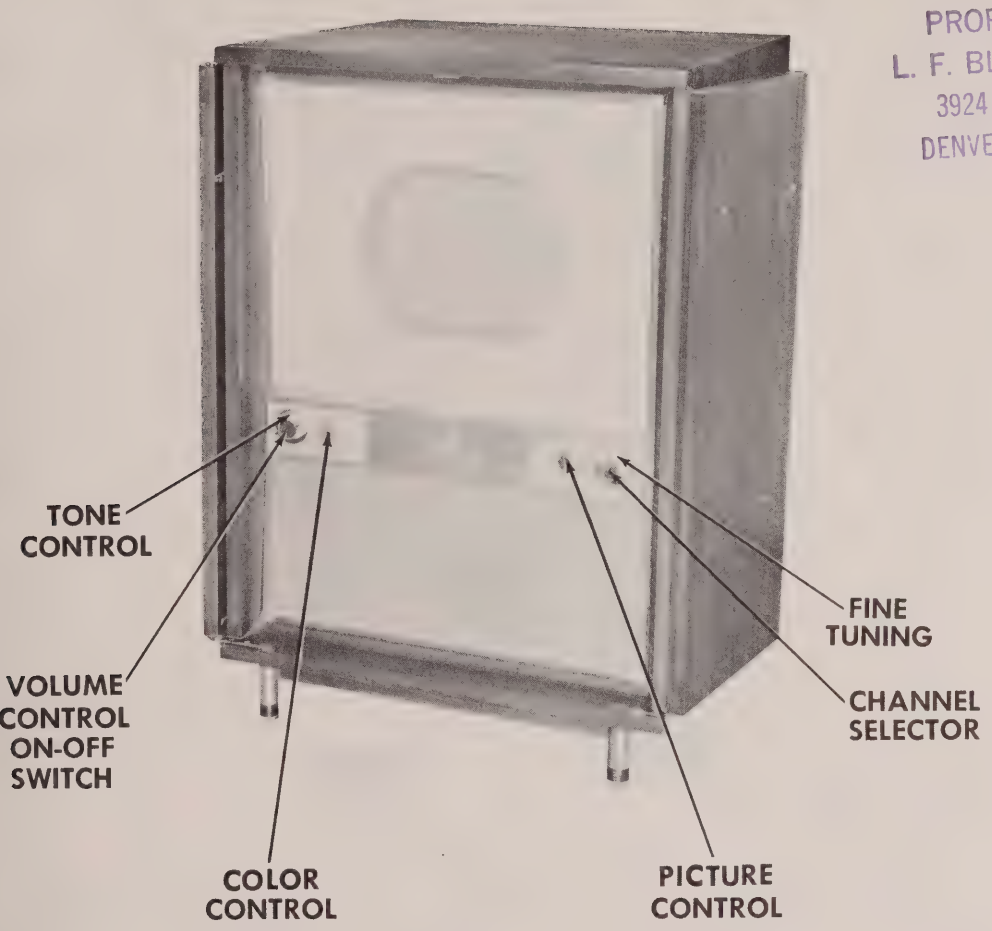

WESTINGHOUSE
MODEL H-840CK15 (Ch. V-2284-15)

TRADE NAME	Westinghouse Model H-840CK15 (Ch. V-2284-15)
MANUFACTURER	Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J.
TYPE SET	Color Television Receiver
TUBES	Forty-four
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 4.35 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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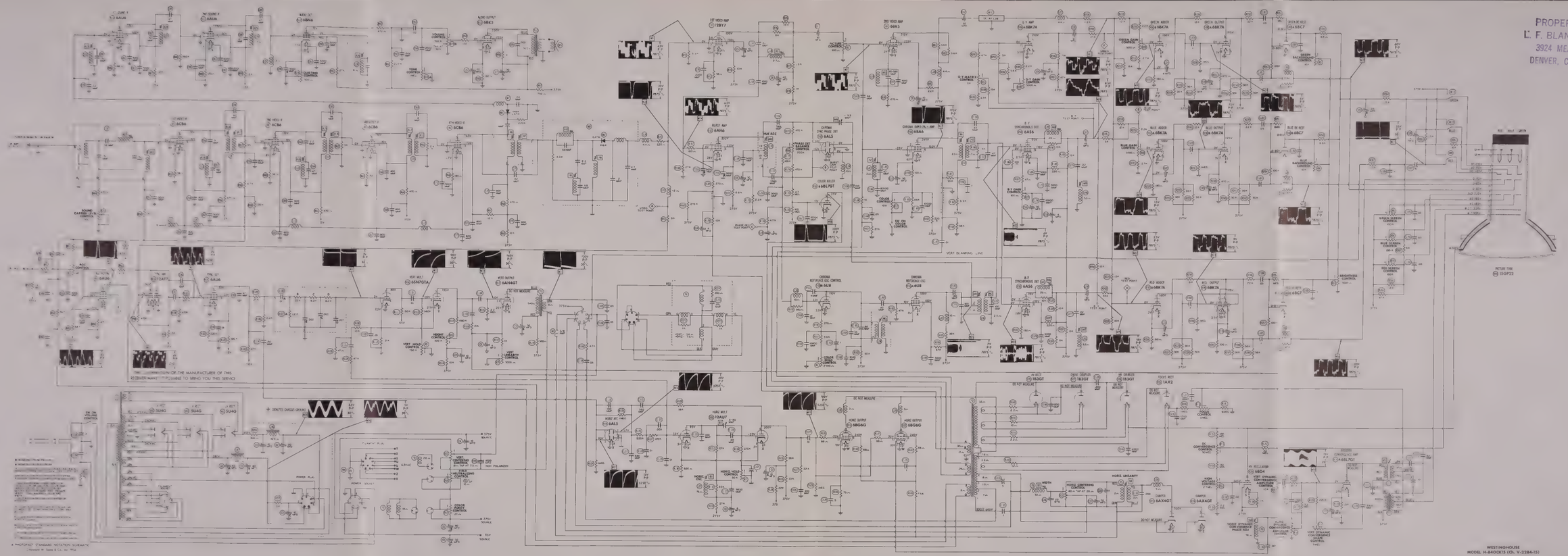

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BLOCK DIAGRAM

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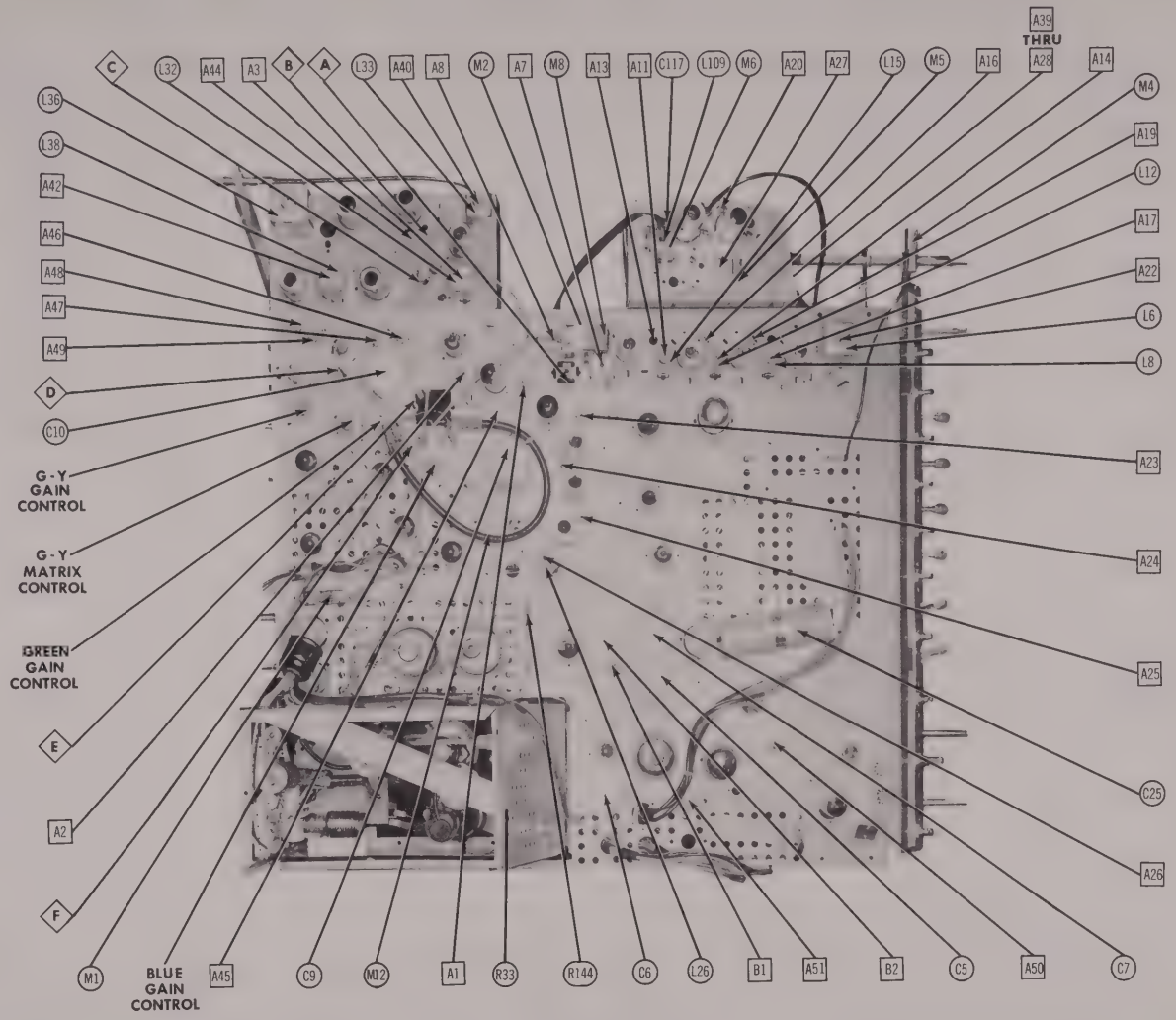

CHASSIS TOP VIEW

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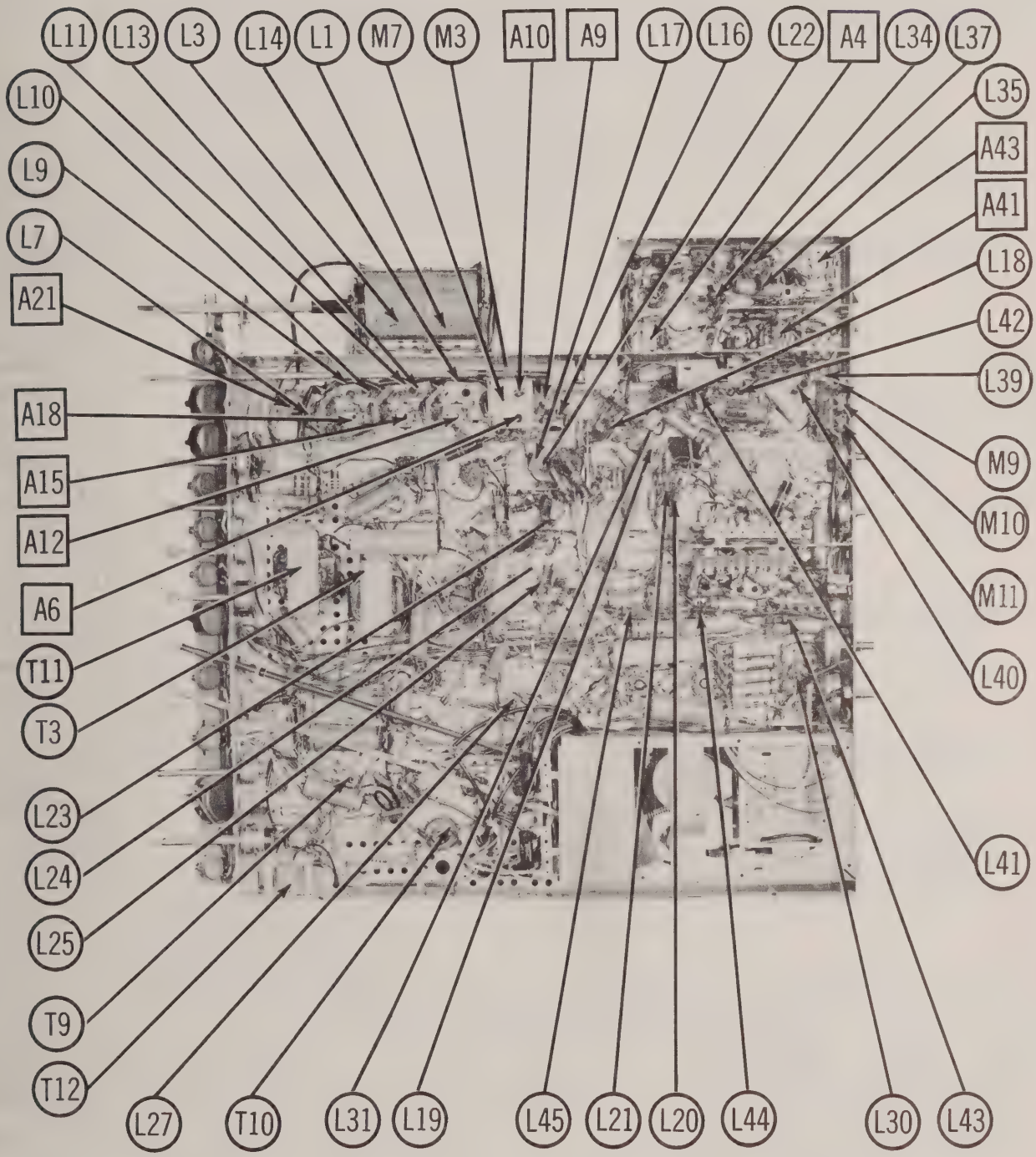

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

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ALIGNMENT INSTRUCTIONS

VIDEO AMPLIFIER AND CHROMA BAND PASS AMPLIFIER ALIGNMENT

Remove V41 (5U4G), the 410 volt rectifier tube from its socket.
Set the contrast control to its maximum contrast position.
Remove the 4th video IF amplifier tube (6CB6/V6) from its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.005MFD	High side to pin 2 (grid) of 12BY7 (V7). Low side to chassis.	2.5MC (3MC Swp)	3.05MC 3.05MC 4.05MC	Any	Vert. Amp. thru detector probe (Fig.7) to pin 3 or 7 of 6BK5 (V8). Low side to chassis.	A1	Short out 4.5MC sound trap (not used in all sets) in cathode circuit of first video amp 12BY7 (V7). Adjust A1 for peaked response similar to Fig. 1.
2.		"	"	3.75MC 3.58MC 4.05MC	"	Vert. Amp. thru detector (Fig.8) to pin 1 (grid) of 6BA6 (V30). Low side to chassis.	A2	Adjust for response similar to Fig. 2.
3.		High side to pin 1 (grid) of 6BA6 (V30). Low side to chassis.	"	"	"	Vert. Amp. thru detector (Fig.7) to pin 1 (grid) of 6DB6/6AS6 (V35). Low side to chassis.	A3, A4	Adjust for response similar to Fig. 3.
4.	"	High side to pin 2 (grid) of 12BY7 (V7). Low side to chassis.	"	"	"	"		Check for response similar to Fig. 3. Remove short across 4.5MC sound trap in cathode circuit of V7.
5.	"	"	Not used	4.5MC (Unmod)	"	Use VTVM. DC probe thru detector (Fig.7) to pin 3 or 7 of 6BK5 (V8). Common to chassis.	A5	If set has 4.5MC sound trap coil in cathode circuit of first video amp (V7), adjust the coil slug (A5) for MINIMUM deflection. Replace V8 in its socket.

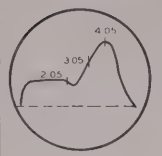


FIG. 1

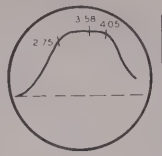


FIG. 2

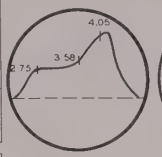


FIG. 3

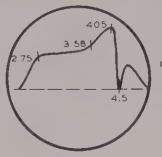


FIG. 4

VIDEO IF ALIGNMENT

Connect a 470MMF capacitor across the vertical input terminals of oscilloscope.
Connect the negative lead of a 15 volts bias supply to the ungrounded side of C53. Connect the positive lead to chassis.
Adjust the AGC control (R1) for -4 volts at Pin 1 (grid) of 6CB6 (V3).
Remove V3, the RF amplifier tube (6BQ7A or 6BZ7), from its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.005MFD	High side to pin 1 (grid) of 6CB6 (V6). Low side to chassis	44MC (10MC Swp)	41.25MC 41.75MC 42.25MC 44.0MC 45.75MC 47.25MC	13	Vert. Amp. thru 47KΩ to point ⏚. Low side to chassis.	A6, A7, A8, A9, A10	Connect alligator clip to pin 5 (plate) of 6CB6 (V5). Detune A9 and A10 by adjusting fully clockwise. Adjust A6, A7 and A8 for response similar to Fig. 9. Adjust A9 and A10 for MINIMUM marker amplitude at 41.25MC. SLIGHTLY retouch A6, A7 and A8 to obtain desired response.
7.	"	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	"	"	"	"	A11, A12,	Move alligator clip from pin 5 of V5 to pin of V4. Adjust A11 and A12 for response similar to Fig. 10.
8.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	"	"	"	A14, A15, A16	Move alligator clip from pin 5 of V4 to pin 5 of V3. Detune A16. Adjust A14 and A15 for response similar to Fig. 11. Adjust A16 for MINIMUM marker amplitude at 47.25MC. Remove alligator clip from pin 5 of V3.
9.	"	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	"	39.75MC 41.25MC 42.25MC 44.0MC 45.75MC 47.25MC	"	"	A17, A18, A19	Detune A19. Adjust A17 and A18 for response similar to Fig. 12. Adjust A19 for MINIMUM marker amplitude at 39.75MC.
10.	Direct	High side to an ungrounded tube shield (foating over converter tube (V2). Low side to tuner chassis.	"	"	"	"	A20, A21,	Adjust for response similar to Fig. 13.
11.	"	"	"	41.25MC	"	"	A22	Adjust sound level carrier control (R32A) for MINIMUM rejection at 41.25MC. Adjust A22 for MINIMUM marker amplitude at 41.25MC. If necessary, retouch A8 and A10 for MINIMUM marker amplitude at 41.25MC. Readjust sound level carrier control (R32A) for MINIMUM marker amplitude at 41.25MC.

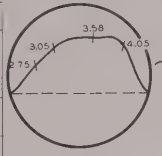


FIG 5

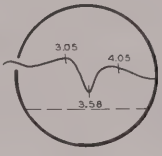


FIG. 6

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	.001MFD	High side to pin 1 (grid) of 6AU6 (V10). Low side to chassis.	4.5MC (15KC Swp)	4.5MC	Any	Vert. Amp. across volume control.	A23, A24, A25	Attenuate generator output for MINIMUM useful indication on scope. Adjust for maximum response centered about 4.5MC.
13.	"	"	"	"	"	"	A26	Set generator to give a strong signal and adjust A26 for maximum response at 4.5MC.
14.	"	"	Not used	4.5MC (400\Mod)	"	"	R24	Starting with a very low signal input gradually increase the level, at the same time rotating the quieting control (R24) back and forth until the signal level reaches the point where the AM output on the scope dips to zero with a rise on each side as R24 is rotated. Set R24 for zero output at this signal level.

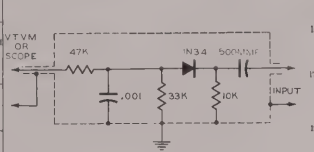


FIG. 7

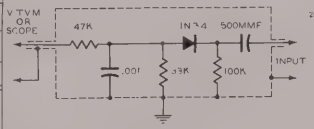


FIG. 8

SOUND IF ALIGNMENT USING A TV SIGNAL

Replace V41 (5U4G) and V2 (6BQ7A or 6BZ7) in their sockets.
Tune the receiver to a TV station and connect an attenuator between receiver and antenna so that the signal input to the receiver can be varied from weak to strong. If a suitable attenuator is not available, disconnect the antenna lead-in and stray feed the signal into the receiver by placing the lead-in near the antenna terminals. Adjust A23, A24 and A25 for maximum program sound. If peaks appear at two different slug settings use the one at farthest counter clockwise position.
Reduce input signal to lowest useable level and recheck settings of A23, A24 and A25.
Apply a strong signal and adjust A26 for maximum program sound. If two widely separated peaks appear use the one with A26 farthest counter clockwise.
If two peaks appear within a narrow range of adjustment, the signal strength being applied is too low or the quieting control (R24) is improperly adjusted, apply a weak signal and adjust R24 for minimum noise. Normal adjustment should occur near the mid-range setting of R24.

OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A37. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel.
If adjustment of A37 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Fig. 15	Across antenna terminals thru matching pad (Fig.15)	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point ⏚. Low side to chassis.	A28	Adjust to place sound marker in trap notch as in Fig. 14.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A29	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A30	
			193MC (10MC Swp)	193.25MC 197.75MC	10		A31	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A32	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A33	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A34	
			83MC (10MC Swp)	83.25MC 87.75MC	6		A35	
			75MC (10MC Swp)	77.25MC 81.75MC	5		A36	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A37	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A38	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A39	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable.
Alignment of this portion should not be required in the field.

3.58MC SUB CARRIER ALIGNMENT

Disable the chroma reference oscillator (V33A) by shorting Pin 7 (cathode) to chassis with a short jumper.
Disable the color killer by removing V41 (5U4G) from its socket.
Connect the junction of R165 and R169 (270KΩ and 270Ω in cathode circuit of V31) to chassis with a short jumper.
The generator used should provide a 3.58MC signal with crystal accuracy.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	.005MFD	High side to pin 1 (grid) of 6AH6 (V31). Low side to chassis.	Not used	3.58MC (400\Mod)	Any	Vert. Amp. thru detector probe (Fig. 8) to point ⏚. Low side to chassis.	A40	Attenuate generator output to provide 1 volt of signal input to V31. Adjust for maximum 400\ indication on scope.
17.	"	"	"	3.58MC (Unmod)	"	Use VTVM. DC probe to point ⏚. Common to chassis.	R36A	Adjust R36A for zero deflection on VTVM. To check setting of R36A turn control clockwise then counter clockwise. A positive and negative reading should be obtained on either side of correct setting.
18.	"	High side to pin 2 (grid) of 6U8 (V33A). Low side to chassis.	"	3.58MC (400\Mod)	"	Vert. Amp. thru detector probe (Fig. 8) to pin 7 (grid) of 6AS6 (or 6DB6) (V35). Low side to chassis.	A41	Attenuate generator output to provide 1 volt signal input to V33A. Adjust for maximum 400\ indication on scope.
19.	"	"	"	"	"	Vert. Amp. thru detector probe (Fig. 8) to pin 7 (grid) of 6AS6 (or 6DB6) (V34). Low side to chassis.	A42	Adjust for maximum 400\ indication on scope. Remove jumper from pin 7 of V33A to chassis.
20.	"	High side to pin 1 (grid) of 6AS6 (or 6DB6) (V35). Low side to chassis.	"	3.58MC (Unmod)	"	Not used	A43	Connect a .01MFD capacitor from pin 5 of V35 to high side of the volume control (R19B). Remove band pass amplifier tube (6BA6, V30) from its socket. Set the color hold control (R5) to its mid-range position. Adjust A43 for zero beat in speaker. NOTE: Check by turning color hold control (R5) clockwise and counter clockwise for a high frequency beat. Reset R5 for zero beat. Remove .01MFD capacitor from pin 5 of V35 to high side of R19B. Replace V30 in its socket.
21.	.001MFD	High side to pin 1 (grid) of 6BA6 (V30). Low side to chassis.	Not used	3.58MC (Unmod)	Any	DC probe to point ⏚. Common to chassis.	A44	Reconnect jumper from pin 7 (cathode) of 6U8 (V33A) to chassis. Attenuate generator output for 1 volt input to V30. Set VTVM to zero center on 10 volt scale. Leave color hold control (R5) in its approximate mid-range position determined in step 20. Adjust A44 for zero (if zero reading cannot be reached adjust for as near a zero reading as possible).

WESTINGHOUSE
MODEL H-840CK15 (Ch. V-2284-15)

ALIGNMENT INSTRUCTIONS (cont)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22	.001MFD	High side to point (A). Low side to chassis.	2.5MC (5MC Swp)	3.05MC 3.58MC 4.05MC	"	Vert. Amp. thru detector probe (Fig. 8) to point (D). Low side to chassis.	A45	Adjust for MINIMUM 3.58MC marker response as in Fig. 6. Replace V41 in its socket. Remove jumper from pin 7 of V33A to chassis. Remove jumper from junction of R165 and R169 to chassis.

SYNCHRONOUS DETECTOR FILTER ALIGNMENT

Remove V7 (12BY7) from its socket.
Connect a jumper from Pin 7 (cathode) of 6U8 (V33A) to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
23	.01MFD	High side to pin 1 (grid) of V35 (6DB6 or 6AS6) Low side to chassis.	0.5MC (1MC Swp)	0.5MC	Any	Vert. Amp. thru detector probe (Fig. 8) to point (D). Low side to chassis.	A46	Remove V34 (6DB6 or 6AS6) from its socket. Adjust for response similar to Fig. 16. Replace V34 in its socket.
24	"	"	2.5MC (5MC Swp)	3.58MC	"	"	A47	Adjust for MINIMUM response at 3.58MC.
25	"	"	0.5MC (1MC Swp)	0.5MC	"	Vert. Amp. thru detector probe (Fig. 8) to point (E). Low side to chassis.	A48	Remove V35 (6DB6 or 6AS6) from its socket. Adjust for response similar to Fig. 16.
26	"	"	2.5MC (5MC Swp)	3.58MC	"	"	A49	Adjust for MINIMUM response at 3.58MC. Replace V35 and V7 in their sockets. Remove jumper from pin 7 of V33A to chassis.

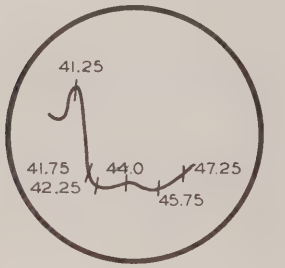


FIG. 9

FIG. 10

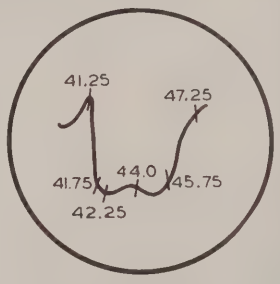


FIG. 11

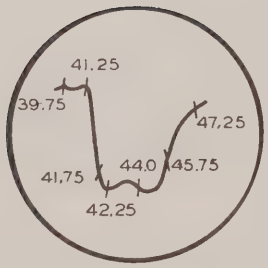


FIG. 12

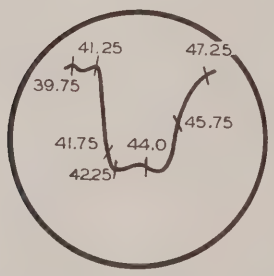
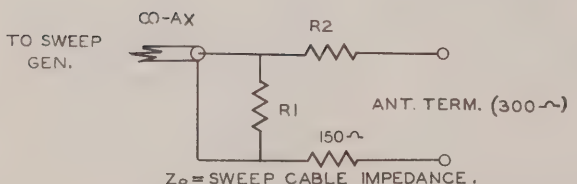


FIG. 13

FIG. 14



Z_o	R1	R2
56~	56~	120~
72~	82~	110~

FIG. 15

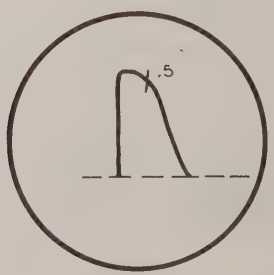
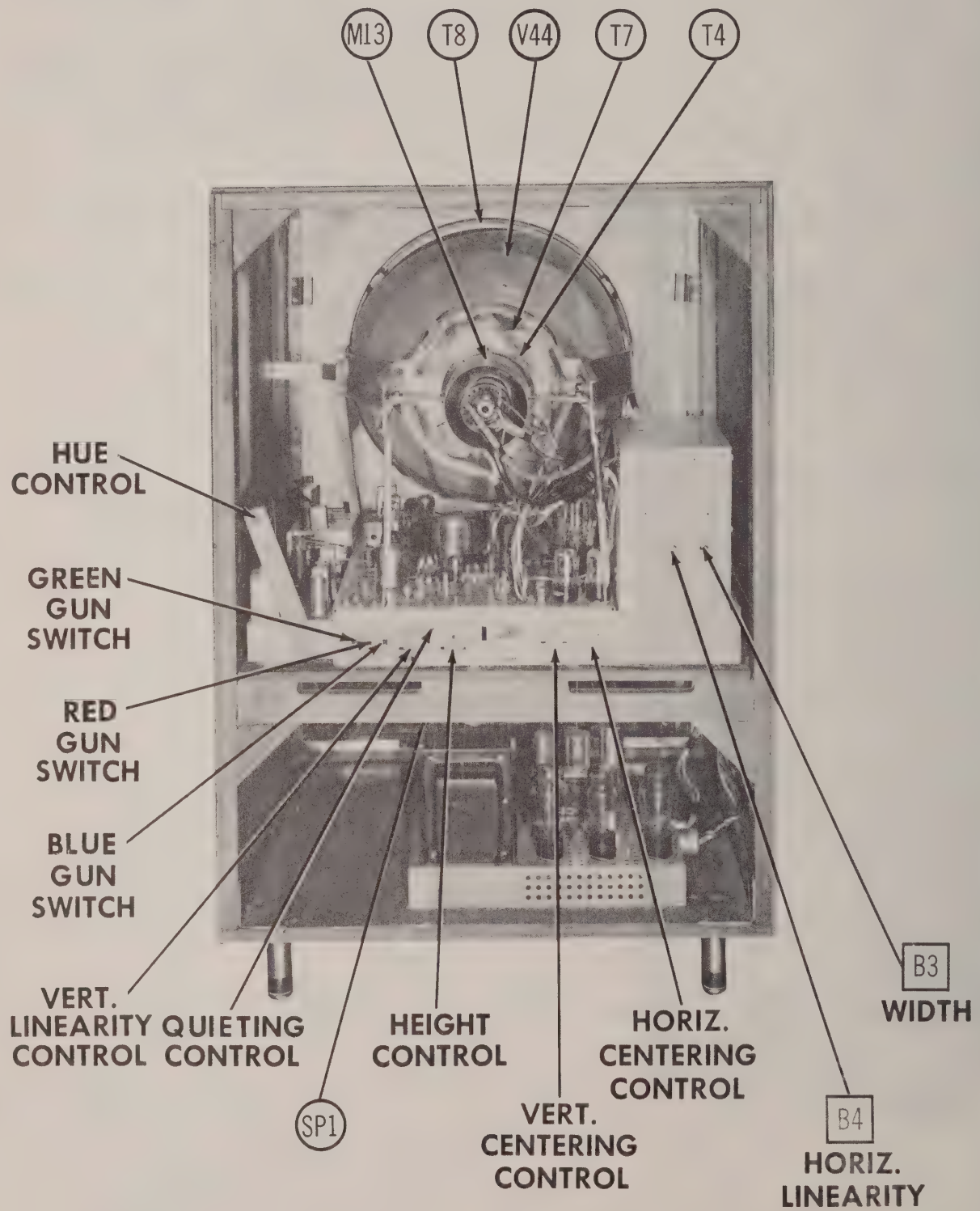
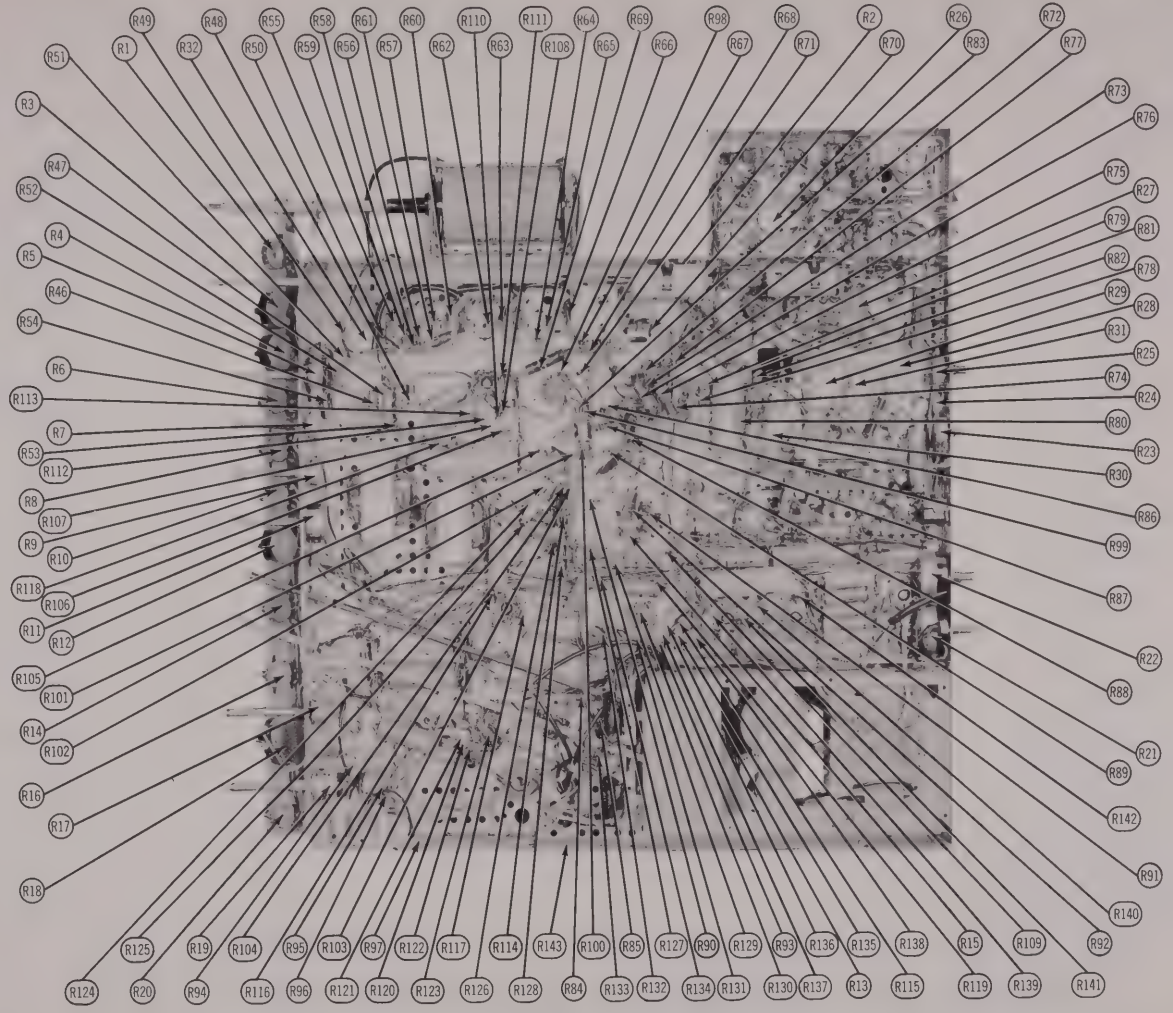


FIG. 16



CABINET-REAR VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION (R1 THRU R143)

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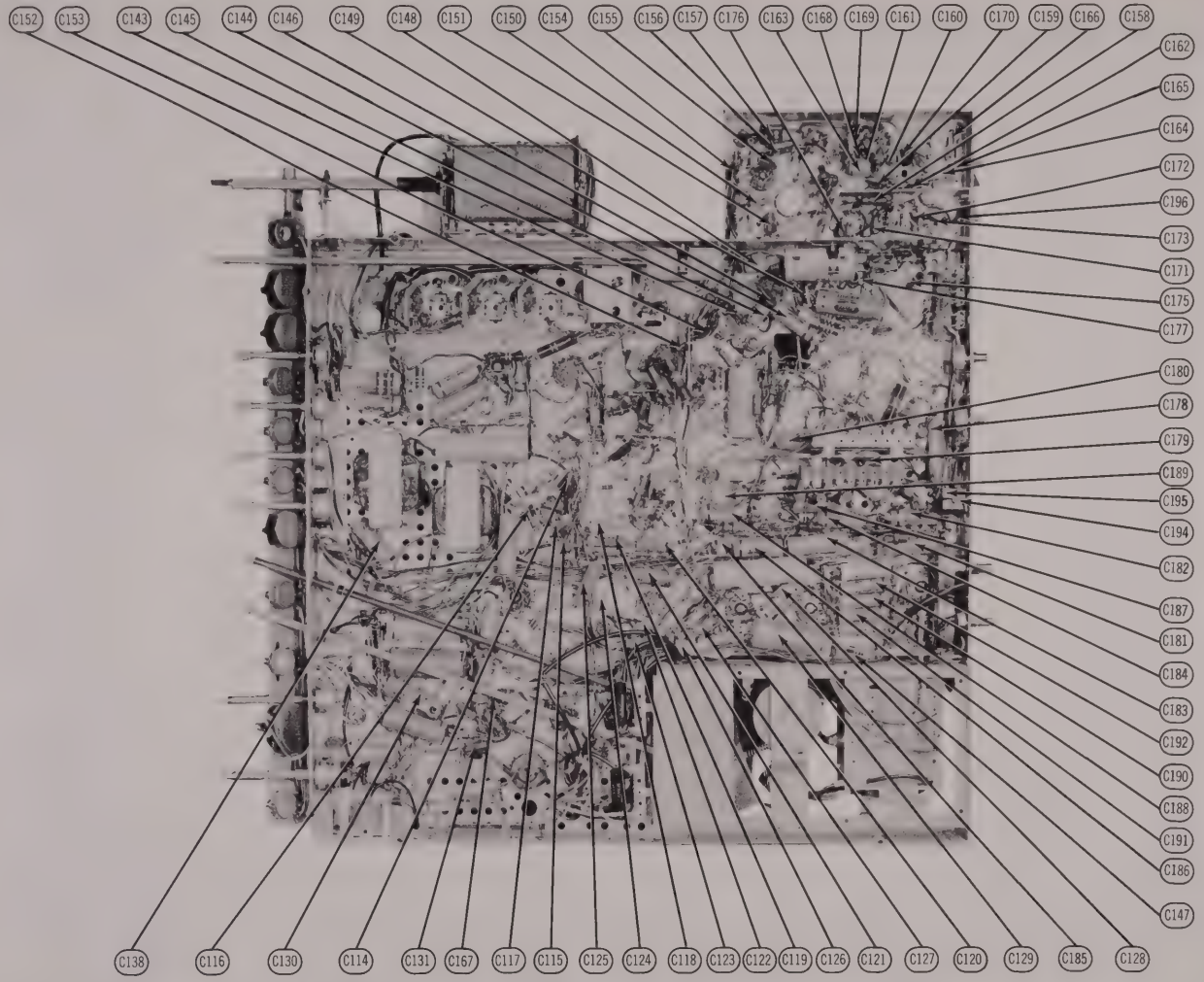
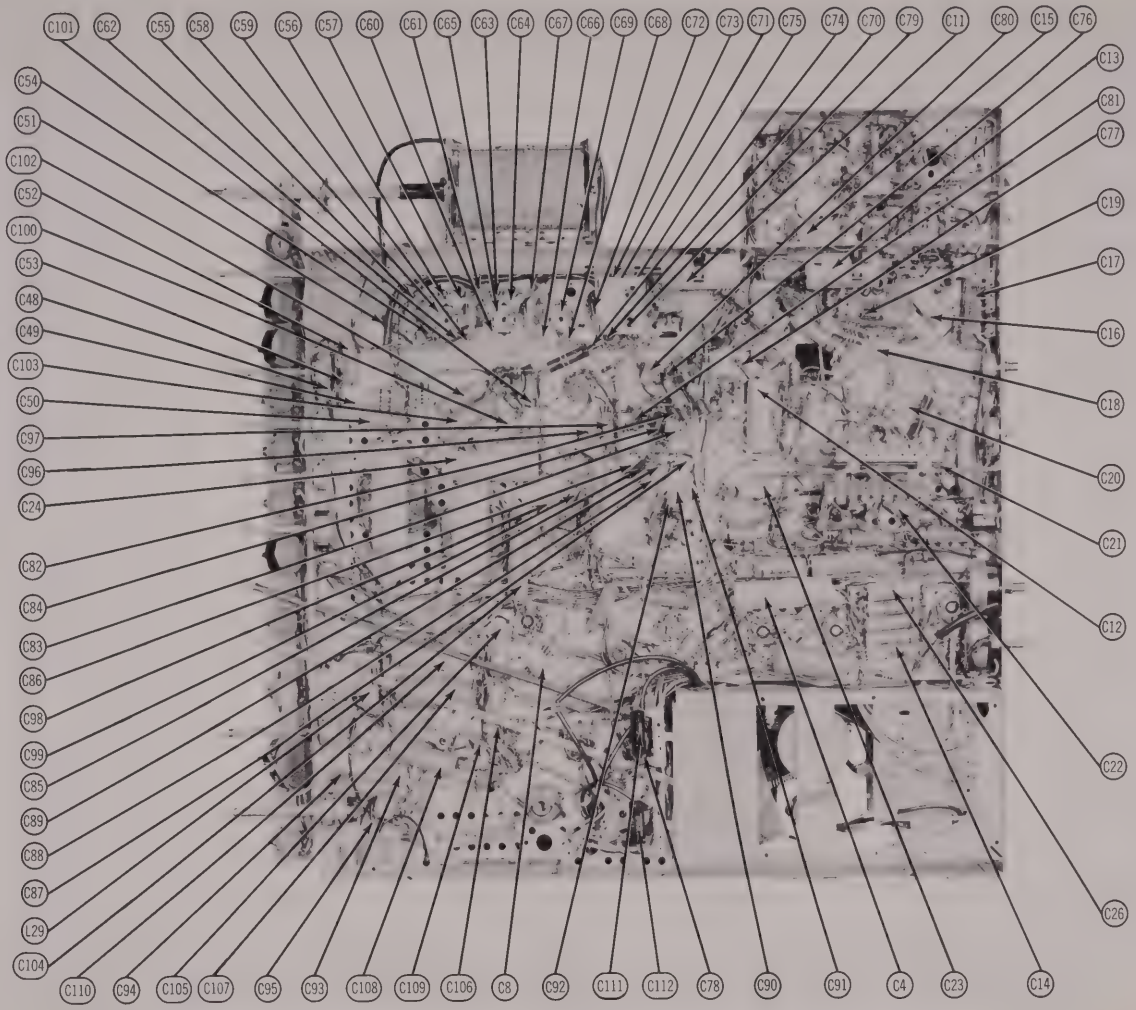
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION (C114 THRU C196)



CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION (C4 THRU C112)

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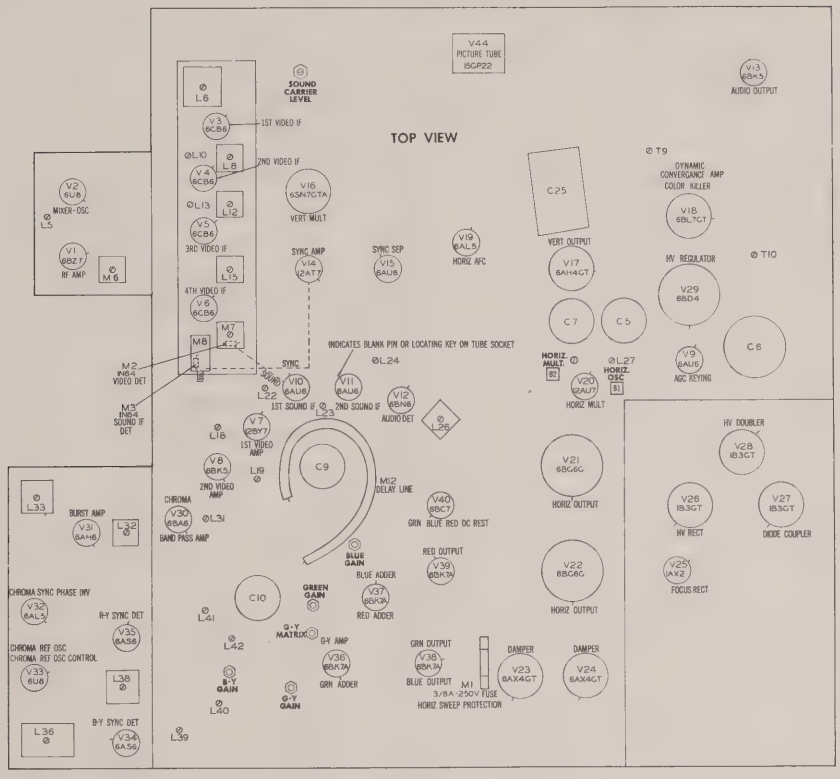
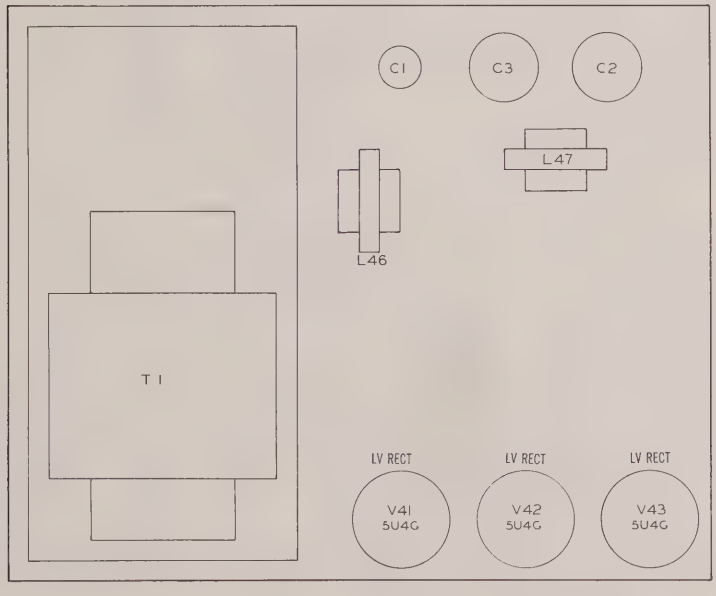
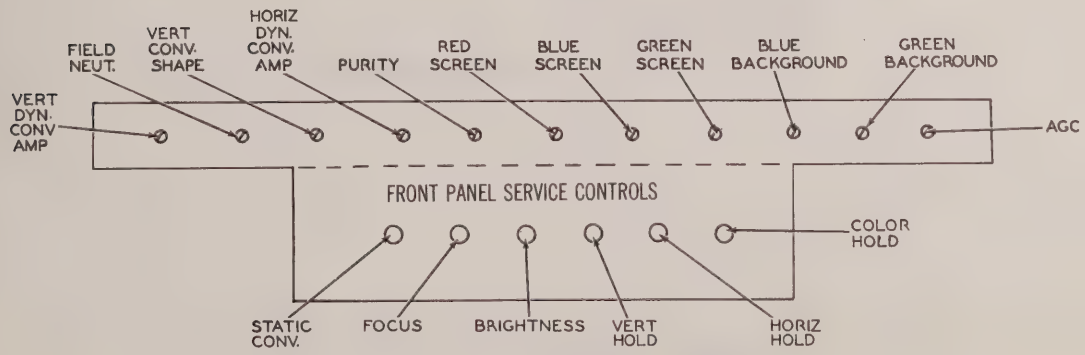
3924 MEADE ST.
DENVER, COLORADO

TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, CO







WESTINGHOUSE
MODEL H-840CK15 (Ch. V-2284-15)

SET 259 FOLDER 15

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†5KΩ	280KΩ	INF	0Ω	.1Ω	INF	2.6Meg	0Ω	0Ω
V 2	6U8	†51KΩ	200KΩ	†110KΩ	.1Ω	0Ω	†11.7KΩ	0Ω	0Ω	6.8KΩ
V 3	6CB6	100KΩ	56Ω	.1Ω	0Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 4	6CB6	105KΩ	56Ω	.1Ω	0Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 5	6CB6	.5Ω	150Ω	.1Ω	0Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 6	6CB6	.5Ω	180Ω	.1Ω	0Ω	†10.6KΩ	†22.5KΩ	0Ω		
V 7	12BY7	56Ω	3.3KΩ	0Ω	.1Ω	.1Ω	0Ω	†7.6KΩ	†33KΩ	0Ω
V 8	6BK5	†2.9KΩ	INF	500Ω	0Ω	.1Ω	270Ω	500Ω	†22KΩ	INF
V 9	6AU6	†20KΩ	†8KΩ	.1Ω	0Ω	1.4Meg	†3KΩ	†8KΩ		
V 10	6AU6	.6Ω	0Ω	.1Ω	0Ω	†4.2KΩ	†4.2KΩ	68Ω		
V 11	6AU6	560KΩ	0Ω	0Ω	.1Ω	†4.2KΩ	†4.2KΩ	120Ω		
V 12	6BN6	500Ω	13Ω	.1Ω	0Ω	†28KΩ	6Ω	†220KΩ		
V 13	6BK5	†1.2KΩ	INF	500KΩ	.1Ω	0Ω	180Ω	500KΩ	†1.9KΩ	INF
V 14	12AT7	INF	INF	0Ω	0Ω	0Ω	†18KΩ	13KΩ	0Ω	.1Ω
V 15	6AU6	940KΩ	0Ω	0Ω	.1Ω	†25KΩ	†180KΩ	0Ω		
V 16	6SN7GT	60KΩ	†100KΩ	1.1KΩ	800KΩ	¶950KΩ	1.1KΩ	.1Ω	0Ω	
V 17	6AH4GT	2.2Meg	0Ω	INF	2.2Meg	†1.2KΩ	†1.2KΩ	.1Ω	2KΩ	
V 18	6BL7GT	3.3Meg	¶1.5KΩ	105KΩ	†5.3Meg	27KΩ	0Ω	.1Ω	0Ω	
V 19	6AL5	1Meg	0Ω	0Ω	.1Ω	1Meg	0Ω	2Meg		
V 20	12AU7	† 54KΩ	2.7Meg	820Ω	.1Ω	.1Ω	†78KΩ	300KΩ	820Ω	0Ω
V 21	6BG6G	INF	0Ω	75Ω	1Meg	1Meg	INF	.1Ω	¶7.9KΩ	TOP CAP ▲8Ω
V 22	6BG6G	INF	0Ω	75Ω	INF	1Meg	¶7.8KΩ	.1Ω	¶7.9KΩ	TOP CAP ▲8Ω
V 23	6AX4GT	INF	INF	INF	INF	¶90Ω	¶400Ω	.1Ω	0Ω	
V 24	6AX4GT	INF	INF	INF	INF	¶90Ω	INF	.1Ω	0Ω	
V 25	1AX2	INF	16Meg	INF	INF	INF	INF	INF	INF	14Meg TOP CAP ▲3.3Ω
V 26	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP ▲40Ω
V 27	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP INF
V 28	1B3GT	INF	235Meg	INF	INF	INF	INF	235Meg	INF	TOP CAP INF
V 29	6BD4GT	†130Ω	†1.1KΩ	INF	INF	2.2-4.7Meg	INF	†1.1KΩ	INF	TOP CAP 235Meg
V 30	6BA6	28KΩ	0Ω	0Ω	.1Ω	†3.4KΩ	†36KΩ	68KΩ		
V 31	6AH6	27KΩ	10.3KΩ	0Ω	.1Ω	†2.3KΩ	†6.8K	10.3KΩ		
V 32	6AL5	4Meg	4Meg	.1Ω	0Ω	10Ω	0Ω	10Ω		
V 33	6U8	†150KΩ	47KΩ	† 47KΩ	.1Ω	0Ω	†39KΩ	.7Ω	5KΩ	3.5Meg
V 34	6AS6	100Ω	550Ω	.1Ω	0Ω	†19KΩ	†9.3KΩ	2.5Ω		
V 35	6AS6	1.7Ω	150Ω	.1Ω	0Ω	†19KΩ	†9.3KΩ	1.1Ω		
V 36	6BK7	†10KΩ	7.7KΩ	180Ω	.1Ω	0Ω	†20KΩ	10KΩ	7.2KΩ	0Ω
V 37	6BK7	†10KΩ	6KΩ	180Ω	0Ω	.1Ω	†10KΩ	2.7KΩ	180Ω	0Ω
V 38	6BK7	†10KΩ	1Meg	470Ω	0Ω	.1Ω	†10KΩ	1Meg	470Ω	0Ω
V 39	6BK7	†19KΩ	1Meg	330Ω	0Ω	.1Ω	†19KΩ	1Meg	330Ω	0Ω
V 40	6BC7	1Meg	0-9KΩ	0Ω	0Ω	.1Ω	0-9KΩ	1Meg	0-5KΩ	1Meg
V 41	5U4G	INF	17KΩ	INF	28Ω	INF	30Ω	INF	17KΩ	
V 42	5U4G	INF	11KΩ	INF	8.5Ω	INF	8Ω	INF	11KΩ	
V 43	5U4G	INF	11KΩ	INF	8.5Ω	INF	8Ω	INF	11KΩ	
V 44	15GP22	13-18KΩ	3-8KΩ	1.1Meg	¶0-7KΩ	PIN 6 8-13Meg	PIN 7 1.5-6.5KΩ	PIN 8 1.1Meg	PIN 9 ¶10-40KΩ	PIN 13 107-157Meg
		PIN 17 ¶10-35KΩ	PIN 18 1.1Meg	PIN 19 1.5-6.5KΩ	PIN 20 13-18KΩ					

† MEASURED FROM PIN 8 OF V43
¶ MEASURED FROM PIN 8 OF V42
▲ MEASURED FROM PIN 3 OF V24

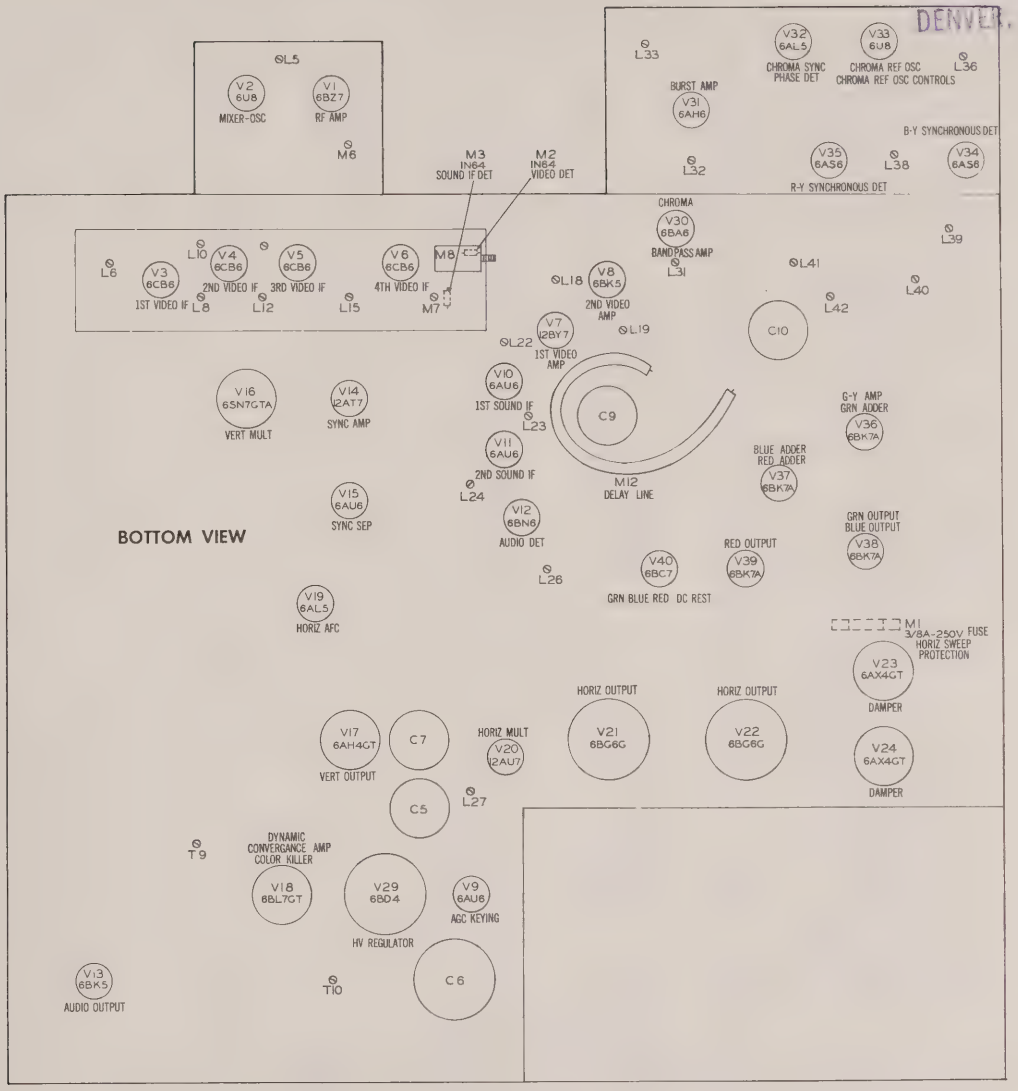
DISASSEMBLY INSTRUCTIONS

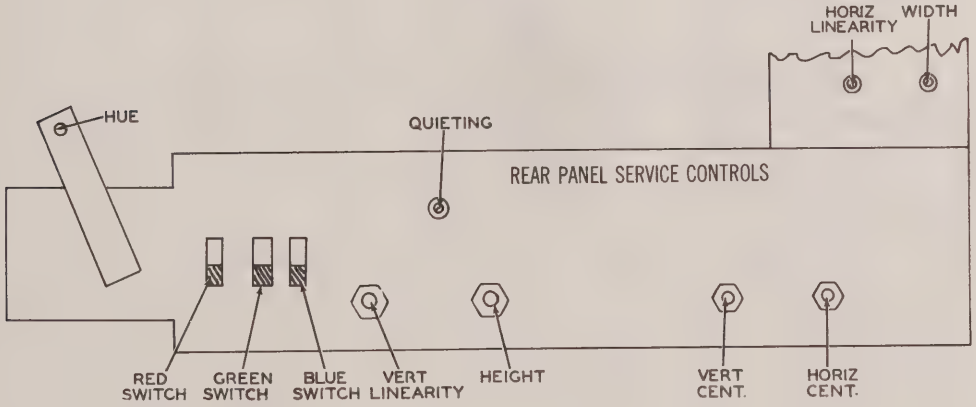
1. Remove 6 push-on type control knobs from front panel.
2. Remove 11 wood screws. Remove rear cover.
3. Disconnect speaker leads and 2 cables from power chassis.
4. Remove 6 chassis bolts. Remove TV chassis.
5. Remove 4 chassis bolts. Remove power chassis.
6. Remove 4 speaker nuts. Remove one speaker.

NOTE: To gain access to all front panel controls, remove 2 small wood screws at opening of control door.

TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO





WESTINGHOUSE
MODEL H-840CK15 (Ch. V-2284-15)

PARTS LIST & DESCRIPTION

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Westinghouse PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Mixer-Oscillator	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	1st. Video Amp.	12BY7	12BY7	9A	
V8	2nd. Video Amp.	6BK5	6BK5	9BQ	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st. Sound IF	6AU6	6AU6	7BK	
V11	2nd. Sound IF	6AU6	6AU6	7BK	
V12	Audio Detector	6BN6	6BN6	7BK	
V13	Audio Output	6BK5	6BK5	9BQ	
V14	Sync Amplifier	12AT7	12AT7	7BT	
V15	Sync Separator	6AU6	6AU6	7BK	
V16	Vert. Mult.	6SN7GTA	6SN7GTA	7BD	
V17	Vert. Output	6AH4GT	6AH4GT	8EL	
V18	Dynamic Convergence Amp.-Color Killer	6BL7GT	6BL7GT	7BD	
V19	Horiz. AFC	6AL5	6AL5	6BT	
V20	Horiz. Mult.	12AU7	12AU7	9A	
V21	Horiz. Output	6BG6G	6BG6G	5BT	
V22	Horiz. Output	6BG6G	6BG6G	5BT	
V23	Damper	6AX4GT	6AX4GT	4CG	
V24	Damper	6AX4GT	6AX4GT	4CG	
V25	Focus Rectifier	1AX2	1AX2		
V26	HV Rectifier	1B3GT	1B3GT	3C	
V27	Diode Coupler	1B3GT	1B3GT	3C	
V28	HV Doubler	1B3GT	1B3GT	3C	
V29	HV Regulator	6BD4	6BD4		
V30	Chroma Bandpass Amplifier	6BA6	6BA6	7BK	
V31	Burst Amplifier	6AH6	6AH6	7BK	
V32	Chroma Sync Phase Det.	6AL5	6AL5	6BT	
V33	Chroma Reference Osc.-Chroma Reference Osc. Control	6U8	6U8	9AE	
V34	B-Y Synchronous Detector	6AS6	6AS6	7CM	
V35	R-Y Synchronous Detector	6AS6	6AS6	7CM	
V36	G-Y Amplifier-Green Adder	6BK7A	6BK7A	9AJ	
V37	Blue Adder-Red Adder	6BK7A	6BK7A	9AJ	
V38	Green Output-Blue Output	6BK7A	6BK7A	9AJ	
V39	Red Output	6BK7A	6BK7A	9AJ	
V40	Green DC Restorer Blue DC Restorer-Red DC Restorer	6BC7	6BC7	9AX	
V41	LV Rectifier	5U4G	5U4G	5T	
V42	LV Rectifier	5U4G	5U4G	5T	
V43	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	Westinghouse PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V44	15GP22	15HP22		15GP22			

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	10	600	V-14012-1	E3A316		BRHV610		TC92	R1222	
C2	20	600	V-14013-1	E4A219		BRHV620				
C3A	▲40	450	V-12985-1	AFH3-46		C037		FP378	TVL-3792	
B	■80	450								
C	▲10	450								
C4	10	600	V-12943-1	PRS600/10		BRHV610		TC92		
C5A	■30	450	V-14212-1	AFH4-71		D059		FP444.8	TVL-3840	
B	▲20	150							TVA-1205	
C	▲30	450								
D	20	25								
C6A	▲4	250	V-14215-1	AFH4-114		D083			TVL-4819	
B	▲80	450								
C	▲10	475								
D	40	50								
C7A	▲10	450	V-14216-1	AFH4-81		D013		FP237	TVL-4769	
B	■30	450						TC72		
C	▲30	450								
D	10	50								
C8	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C9A	▲40	450	V-14214-1	AFH4-17		D016		FP476	TVL-4840	
B	10	450								
C	■10	450								
D	▲10	450								
C10A	▲40	25	V-14213-1	AFH4-01		D001		FP430.6	R1548	
B	40	25								
C	▲40	25								
D	■40	25								
C11	30	450	V-6570-1	PRS450/30		BR3045		TC77	TVA-1711	
C12	30	450	V-6570-1	PRS450/30		BR3045		TC77	TVA-1711	
C13	30	450	V-6570-1	PRS450/30		BR3045		TC77	TVA-1711	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

PROPERTY OF
L. F. BLANKENEY
3924 MEADE ST
DENVER, COLORADO

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C14	4	50	V-4637	PRS150/4		BR550		TC30	TVA-1402	
C15	4	50	V-4637	PRS150/4		BR550		TC30	TVA-1402	
C16	50	25	V-4636	PRS25/50		BR502		TC29	TVA-1206	
C17	10	450	V-10293-1	PRS450/10		BR1045		TC72	TVA-1705	
C18	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C19	10	450	V-10293-1	PRS450/10		BR1045		TC72	TVA-1705	
C20	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C21	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C22	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C23	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C24	10	600	V-12943-1					TC92	R1222	
C25	1000	15	V-14029-1	E26D246					R1549	Note 1
C26	20	25	V-3236-1	PRS25/25		BR202		TC26	TVA-1205	
C27	20	25	V-3236-1	PRS25/25		BR202		TC26	TVA-1205	
C28	20	25	V-3236-1	PRS25/25		BR202		TC26	TVA-1205	
C29	4	450	V-4885	PRS450/4		BR445		TC70	TVA-1702	
C30	.5-3				829-3		3115-01-0R5	CT565A		
C31	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	3			SI3NP0	TCZ-3	Z007	NP0K-030	ZT-5533	5TCCB-V33	
C33	.5-3				829-3		3115-01-0R5	CT565A		
C34	800			EF-001	MFT-1000				503C-D1	
C35	1.5			SI1.5NP0	TCZ-1.5	Z004	NP0K-1R5	ZT-5515	5TCCB-V15	
C36	47			SI47	D6-470	G033	801-470	UC-5447	5GA-Q47	
C37	800			EF-001	MFT-1000				503C-D1	
C38	47									
C39	.5-3				829-3		3115-01-0R5	CT565A		
C40	5									
C41	10			SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C42	.5-3				829-3		3115-01-0R5	CT565A		
C43	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C44	220			SI220	D6-221	G051	GP2K-221	UC-5322	5GA-T22	
C45	68			SI68	D6-680	G038	811-680	UC-5468	5GA-Q68	
C46	800			EF-001	MFT-1000				503C-D1	
C47	800			EF-001	MFT-1000				503C-D1	
C48	.02	400	RCP10M4203M	P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C49	.5	400	RCP10W4504M	P488-5		CUB4P5		PT405	4TM-P5	
C50	.1	400	RCP10W4104M	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C51	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C52	.02	600	RCP10M4203M	P688-02	DF-203	CUB6S2	817-02	PT612	6TM-S2	
C53	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C54	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C55	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C56	3		V-5658-18	SI3NP0	TCZ-3	TZ06	NP0K-030	ZT-5533	5TCCB-V33	
C57	68		R1CC32C0G680K	SI68NP0	TCZ-68	TZ26	NP0L-680	ZT-5468	5TCC-Q68	
C58	.82		V-5658-21							
C59	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C60	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C61	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C62	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C63	2.2		V-5658-14	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C64	47		R1CC32C0G470K	SI47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C65	.56		V-5658-19							
C66	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C67	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C68	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C69	8									
C70	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C71	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C72	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C73	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C74	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C75	.82		V-5658-21							
C76	2000		R2CC63Y5Y202M	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C77	1000	500	RCM20B102K	1464-001		1R5D1		MCB255	MS-21	
C78	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C79	22		R1CC22S2L220K	SI22NP0	TCZ-22	TZ14	NP0K-220	ZT-5422	5TCC-Q22	
C80	150	500	RCM20B151K	1469-00015		22R5T15		MCB236		
C81	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C82	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C83	150	500	RCM20B151K	1469-00015		22R5T15		MCB236		
C84	47	500	RCM20B470K	1469-00005	TCZ-47	22R5Q47	NP0K-470	MCB225	MS-45	
C85	2000		R2CC63Y5Y202M	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C86	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C87	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C88	47	500	RCM20B470K	1469-00005		22R5Q47		MCB225	MS-45	
C89	47	500	RCM20B470K	1469-00005		22R5Q47		MCB225	MS-45	
C90A	5000		V-9044-1	BPD-2X0047	DD3-502	DK079	811-005	DCD-525	5HK-2D5	
B	5000						811-005			
C91	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C92	1500		R2CC62Y5Y152M	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C93	.02	600	RCP10M4203K	P688-02	DF-203	CUB6S2	817-02	PT612	6TM-S2	
C94	2000		R2CC63Y5Y202M	BPD-002	DD-202	K072	801-002	DC-525	5HK-D2	
C95	.005	600	RCP10M6502M	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C96	270	500	RCM20B271K	1469-0003		5R5T27		MCB241	MS-33	
C97	.01	600	RCP10M6103M	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C98	.01	600	RCP10M6103M	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C99	47	500	RCM20B470K	1469-00005		22R5Q47		MCB225	MS-45	
C100A	.01					K082	811-01	DC-511		
B	.002		♦V-11192-1	♦PA-111	♦PC-101	K072	801-002	DC-522	♦105C1	
C	.005					K080	811-005	DC-525		
D	.005					K080	811-005	DC-525		
C101	.01	600	RCP10M6103M	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C102	.05	600	RCP10W4503M	P688-05	DF-503	CUB6S5		PT615	6TM-S5	
C103	.1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C104	.1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C105	.05	600	RCP10M6203K	P688-05	DF-503	CUB6S5		PT615	6TM-S5	
C106	.1	400	RCP10M4104M	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C107	.5	600	RCP10M4504M	684-5		ST6P5		PT605	6TM-P5	
C108	.25	600	RCP10M6254M	684-25		CUB6P25		PT6025	6TM-P25	
C109	3300	500	RCM30C332K			1R5D33				
C110	.25	600	RCP10M6254M	684-25		CUB6P25		PT6025	6TM-P25	
C111	.001	6000	V-9571-1	6089-001		CUB60D1		0W621	TVM-216	
C112	.001	6000	V-9571-1	6089-001		CUB60D1		0W621	TVM-216	
C113	500	10000	V-14027-1	HV10C	TV3-501	MMU20T5	413	HV20035A	20DK-T5	
C114	150	500	RCM20B151K	1469-00015		22R5T15		MCB236		
C115	390	500	RCM20B391K	1469-0004		5R5T39		MCB243	MS-34	
C116	100	500	RCM20B101K	1469-0001		22R5T1		MCB235	MS-31	
C117	680	500	RCM20B681K	1479-0007		5R5T68			MS-37	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C118	01	600	RCP10M6103M	P688-01	DE-103	CUBE01	GP2-333-103	PT611	6TM-S1	
C119	.005	500	RCP10M6054M	P688-005	DE-502	CUBD05	GP2-333-502	PT625	6TM-D5	
C120	01	600	RCP10M6103M	P688-01	DE-103	CUBG01	GP2-333-103	PT611	6TM-S1	
C121	47	600	RCP10M6474M	P688-1	DF-104	CUB4P1		PT401	4TM-P1	
C123	100	500	RCP10M6101K	1469-0001		CUB5T1		MC B235	MS-31	
C123	3900	300	RCP10M6392K	1464-004		CUB3D9		MC B463	MS-24	
C124	100	500	RCP10M6101K	1469-0001		CUB5T1		MC B235	MS-31	
C125	1	600	RCP10M6105M	P688-1	DF-104	CUB4P1		PT401	4TM-P1	
C126	390	500	RCM20M390K	1469-0004		NRT339		MC B243	MS-34	
C127	01	600	RCP10M6103M	P688-01	DE-103	CUBE01	GP2-333-103	PT611	6TM-S1	
C128	1	600	RCP10M6105M	P688-1	DF-104	CUB4P1		PT401	4TM-P1	
C129	.047	600	RCP10M6454M	684-5		ST695		PT605	6TM-P5	
C130	.005	600	RCM75H472J	P688-005	DE-502	CUBD05	GP2-333-502	PT625	6TM-D5	
C131	3300	500	RCM30L332K			1R5D33				
C132	.068	600	RCP10M6683M	P688-068		CUBE68		PT611	6TM-S1	
C133	5	600	RCP10M6594M	684-5		ST695		PT601	6TM-P5	
C134	02	600	RCP10M6203M	P688-02	DF-203	CUB6Z	817-02	PT612	6TM-S2	
C135	1	600	RCP10M6105M	P688-1	DF-104	CUB4P1		PT401	4TM-P1	
C136	1200	15000	V-9301-4							
C137	0047	6000	V-9296-1			CUB6D05		GW825	TVM-256	
C138	.05	600	RCP10M6503M	P688-05	DF-503	CUB6S5		PT605	6TM-S5	
C139	1200	15000	V-9301-4							
C140	1200	15000	V-9301-4							
C141	2000	20000	V-12969-3							
C142	02	600	RCP10M6203K	P688-02	DF-203	CUB6Z	817-02	PT612	6TM-S2	
C143	68		RCC32G680K	5H68N02	DE-681	NP0L-680	CT-5468		5TCC-Q68	
C144	05	600	RCP10M6503K	P688-05	DF-503	CUB6S5		PT605	6TM-S5	
C145	47	500	RCM24M470K	1469-00005		2R5Q47		MC B225	MS-45	
C146	0000			1469-00005		2R5Q47		MC B225	MS-45	
C147	01	600	RCP10M6103M	P688-01	DD-103	K082	81I-01	DK-511	5HK-S1	
C148	05	400	RCP10M6504M	P688-1	DF-104	CUB4P1		PT401	4TM-P1	
C149	.0000		V-9863-1	BPD-01	DD-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C150	47	500	RCM20P470K	1469-00005		2R5Q47		MC B225	MS-45	
C151	47	500	RCM24M470K	1469-00005		2R5Q47		MC B225	MS-45	
C152	22		RCK12G220K	SI22	DE-220	TP22	GPIK-220	UC-5422	5GA-Q22	
C153	0000		RCK30Z502Z102P	BPD-001	DD-102	K080	80I-001	DK-525	5HK-D5	
C154	5000		V-9296-1	BPD-502	DD-502	K080	81I-005	DK-525	5HK-D5	
C155	5000		V-9044-1	BPD-2X0047	DD-502	DK079	81I-005	DCD-525	5HK-D26	
B	5000						81I-005			
C156	3300	500	RCM30L332K			1R5D33				
C157	3300	500	RCM30L332K			1R5D33				
C158	100		RCK12G101J	SI100NP0	TC2-100	TP20	NPO-333-101	ZT-531	5TCC-T1	
C159	5000		V-5596-1	BPD-005	DD-502	K080	81I-005	DC-525	5HK-D5	
C160	10		RCK12G100P	SI10NP0	TC2-10	TZ09	NPOK-100	ZT-541	5TCC-U1	
C161	10		RCK12G100D							
C162	10000		V-9863-1	BPD-01	DD-103	K082	81I-01	DK-511	5HK-S1	
C163	05	400	RCP10M6504M	P688-1	DF-104	CUB4P1		PT401	4TM-P1	
C164	33		RCK12U333J	SI33N750	TCN-33	TN10	N750K-330	NT-5433	5TCU-Q33	
C165	150		RCK33G2D150J	SI150	D5-151	TP36	GPIK-151	UC-5425	5GA-T15	
C166	1000		RBC10T252Z102P	BPD-001	DD-102	K088	80I-001	DK-525	5HK-D1	
C167	10000		V-9863-3	BPD-01	DD-103	K082	81I-01	DK-511	5HK-S1	
C168	3.3		RCK33G3R3K	5H7NP0	TZ22	NPOK-470	ZT-5447		5TCC-Q47	
C169	5000		V-5596-1	BPD-005	DD-502	K080	81I-005	DK-525	5HK-D5	
C170	100		RCK33G101J	SI100NP0	TC2-100	TZ20	NPO-333-101	ZT-531	5TCC-T1	
C171	100		RCK33G101J	SI100NP0	TC2-100	TZ20	NPO-333-101	ZT-531	5TCC-T1	
C172	100		RCK33G101J	SI100NP0	TC2-100	TZ20	NPO-333-101	ZT-531	5TCC-T1	
C173	5000		V-5596-1	BPD-005	DD-502	K080	81I-005	DK-525	5HK-D5	
C174	22		RCK12G220K	SI22	DE-220	TP22	GPIK-220	UC-5422	5GA-Q22	
C175	22		RCK12G220K	SI22	DE-220	TP22	GPIK-220	UC-5422	5GA-Q22	
C176	5000		V-5596-1	BPD-005	DD-502	K080	81I-005	DK-525	5HK-D5	
C177	22		RCK12G220K	SI22	DE-220	TP22	GPIK-220	UC-5422	5GA-Q22	
C178	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C179	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C180	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C181	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C182	05	600	RCP10M6503M	P688-05	DF-503	CUB6S5		PT605	6TM-S5	
C183	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C184	05	600	RCP10M6503M	P688-05	DF-503	CUB6S5		PT605	6TM-S5	
C185	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C186	05	600	RCP10M6503M	P688-05	DF-503	CUB6S5		PT605	6TM-S5	
C187	1	600	RCP10M6104M	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C188	1	400	RCP10W4104M	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C189	1	400	RCP10W4104M	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C190	.03	600	RCP10M6303M	P688-03		CUB6S3		PT613	6TM-S3	
C191	.03	600	RCP10M6303M	P688-03		CUB6S3		PT613	6TM-S3	
C192	.03	600	RCP10M6303M	P688-03		CUB6S3		PT613	6TM-S3	
C193	175	3000	V-14128-2							
C194	01	600	V-5040-15	669ZX-01		CUBS81		PT611	6TM-S1	
C195	01	600	V-5040-15	669ZX-01		CUBS81		PT611	6TM-S1	
C196	5000		V-5596-1	BPD-005	DD-502	K080	81I-005	DC-525	5HK-D5	

Note 1. Non-polarized unit. Replace with same type.
* Items C100A, C100B, C100C, C100D, R107A, R107B, R107C, R107D are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1 Meg	1/2	V-12272-1	Q11-137		BX-89		AGC
R2A	500Ω	2	V-14026-1	Q11-103	A47-500-S	B-4		Picture
B	Shaft		No Reg.	C3	AK-16	Not Req.		Attach to R2A
R3A	10KΩ	2	V-14031-1	WK-10, 000	A43-10K	VK-137	R10,000L	Green background-wire wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R3A
R4A	10KΩ	2	V-14031-1	WK-10, 000	A43-10K	VK-137	R10,000L	Blue background-wire wound
B	Shaft		Not Req.	Not Req.	FKS-1 4	Not Req.	Not Req.	Attach to R4A
R5A	2500Ω	1	V-12281-1	Q11-112		AB-705	U-7	Color Hold
B	Shaft		Not Req.	Not Req.		AB-14	Not Req.	Attach to R5A
R6A	1.00KΩ	1	V-12951-1	Q11-128	A47-100K-S	AB-40	SU-41	Green Screen
B	Shaft		Not Req.	SQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	50KΩ	1	V-11538D-3	Q11-125	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FKS-1	AK-1	Not Req.	Attach to R7A
R8A	100KΩ	1	V-12951-1	Q11-128	A47-100K-S	AB-40	SU-41	Blue screen
B	Shaft		Not Req.	SQ	FKS-1/4	AK-1	Not Req.	Attach to R8A
R9A	750KΩ	1	V-11538D-2	Q11-136	A47-1Meg-S	AB-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	K88-3	AK-4	Not Req.	Attach to R9A
R10A	100KΩ	1	V-12951-1	Q11-128	A47-100K-S	AB-40	SU-41	Red screen
B	Shaft		Not Req.	SQ	FKS-1/4	AK-1	Not Req.	Attach to R10A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	NOTES
R34	22KΩ	1		BTS-22K	
R35	47KΩ	1		BTS-47K	
R36	820KΩ	1		BTS-820K	
R37	220KΩ	1		BTS-220K	
R38	8200Ω	1		BTS-8200	
R39	100KΩ	1		BTS-100K	
R40	100KΩ	1		BTS-100K	
R41	15KΩ	1		BTS-15K	
R43	6800Ω	1		BTS-6800	
R44	3300Ω	1		BTA 3300	
R45	470KΩ	1		BTS-470K	
R46	6800Ω	2	RC40AE682K	BTB 6800	
R47	6800Ω	2	RC40AE682K	BTB 6800	
R48	18KΩ	1	RC40AE183K	BTB-18K	
R49	470Ω	1	V-9827-17	BTS-470	
R50	100Ω	1	RC20AE102K	BTS-1000	
R51	270KΩ	1		BTS-270K	
R52	1.2Meg	1	RC20AE125K	BTS-1.2Meg	
R53	18Meg ±5%	1	RC20AA183K	BTS-18Meg 5%	
R55	82KΩ	1		BTS-82K	
R56	56Ω	1	RC20AE560K	BTS-56	
R57	470Ω	2	RC20AE471K	BTS-470	
R58	3000Ω	1	V-9827-5	BTS-3000	
R59	4700Ω	1	RC20AE472K	BTS-4700	
R60	100KΩ	2	RC20AE104K	BTS-100K	
R61	56Ω	1	RC20AE560K	BTS-56	
R62	4700Ω	1	RC20AE472K	BTS-470	
R63	3000Ω 5%	1	V-9827-5	BTS-3000 5%	
R64	150Ω	1	RC20AE151K	BTS-150	
R65	470Ω	2	RC20AE471K	BTS-470	
R66	2400Ω 5%	1		BTS-2400 5%	
R67	180Ω	1	RC20AE181K	BTS-180	
R68	12KΩ	1	RC20AE123K	BTS-12K	
R69	470Ω	1	RC20AE471K	BTS-470	
R70	10KΩ	2	RC20AE103K	BTB-10K	
R71	56Ω	1	RC20AE560K	BTS-56	
R72	2200Ω	1	RC20AE222K	BTS-2200	
R73	220KΩ	1		BTS-220K	
R74	56KΩ	1	RC20AE563K	BTS-56K	
R75	270KΩ	1		BTA-270K	
R76	1500Ω	1	RC20AE152K	BTS-1500	
R77	56Ω	1	A47-500-S	AB-4	
R78	1000Ω	2		BTB-1000	
R79	270Ω	1	RC20AE271K	BTS-270	
R80	22KΩ	1	RC20AE223K	BTA-22K	
R81	56KΩ	2	RC40AE563K		
R82	5600Ω	2	RC40AE562K		
R83	4700Ω	1	RC20AE472K	BTS-4700	
R84	12KΩ	2	RC40AE123K	BTB-12K	
R85	6800Ω	2	RC40AE682K	BTB-6800	
R86	68Ω	1	RC20AE680K	BTS-68	
R87	1200Ω	1	RC30AE122K	BTA 1200	
R88	560KΩ	1		BTS-560K	
R89	120Ω	1		BTS-120	
R90	1200Ω	1		BTS 1200	
R91	270KΩ	1	RC40AE273K	BTB 27K	
R92	470Ω	1	RC20AE471K	BTS-470	
R93	220KΩ	1	RC20AE224K	BTS-220K	
R94	150Ω	1	RC20AE151K	BTS-150	
R95	180Ω	1	RC20AE181K	BTS 180	
R96	1000Ω	1	RC20AE102K	BTS 1000	
R97	750Ω	10	V-1328-13		
R98	470KΩ	1	RC20AE474K	BTS-470K	
R99	15KΩ	1	RC20AE153K	BTS-15K	
R100	470KΩ	1	RC20AE474K	BTS 470K	
R101	470KΩ	1	RC20AE474K	BTS-470K	
R102	220KΩ	1	RC20AE224K	BTS 220K	
R103	390KΩ	1	RC20AE394K	BTS-390K	
R104	47KΩ	1		BTS-47K	
R105	27KΩ	1	RC30AE273K	BTS-27K	
R106	2200Ω	1	RC30AE222K	BTS-2200	
R107	22KΩ	1		BTS-22K	
			▼V-11192-1	BTS-22K	
			C 820Ω	BTS-8200	
			D 220ΩC	BTS-8200	
R108	10KΩ	1	RC20AE103K	BTS-10K	
R109	47Ω	1	RC20AE470K	BTS-47	
R110	1200Ω	1	RC20AE122K	BTS 1200	
R111	100KΩ	1	RC20AE104K	BTA-100K	
R112	560KΩ	1	RC20AE564K	BTS-560K	
R113	680KΩ	1		BTS-680K	
R114	10KΩ	1	RC20AE103K	BTS-10K	
R115	33KΩ	1	RC20AE333K	BTS-33K	
R116	2.2Meg	1	RC20AE225K	BTS-2.2Meg	
R117	100Ω	1	RC20AE101K	BTS-100	
R118	15KΩ	1		BTS-15K	
R119	560Ω	1	RC30AE561K	BTS-560	
R120	100KΩ	1	RC20AE104K	BTS-100K	
R121	220KΩ	1	RC20AE224K	BTS-220K	
R122	3.3Meg	1	RC20AE335K	BTS-3.3Meg	
R123	1500Ω	2		BTB 1500	
R124	1 Meg	1	RC20AE105K	BTS-1 Meg	
R125	1 Meg	1	RC20AE105K	BTS-1 Meg	
R126	220KΩ	1	RC20AE224K	BTS-220K	
R127	470KΩ	1	RC20AE474K	BTS-470K	
R128	18KΩ	1	RC30AE183K	BTS-18K	
R129	47KΩ	1		BTS-47K	
R130	820Ω	1	RC20AE821K	BTS-820	
R131	27KΩ	1	RC30AE273K	BTS-27K	
R132	22KΩ	1	RC30AE223K	BTS-22K	
R133	27KΩ	1	RC30AE273K	BTS-27K	
R134	270KΩ	1	RC30AE274K	BTS-270K	

* CONCENTRIC EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B13-137E P1-220 (Panel)
B13-133X & R14-308 (Rear)
SWITCH 76-L.

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	NOTES
R135	56KΩ	1		BTS-56K	
R136	22KΩ	1	RC20AE223K	BTS-22K	
R137	22KΩ	1	RC20AE223K	BTS-22K	
R138	1 Meg	1	RC20AE105K	BTS-1 Meg	
R139	68Ω	1	RC20AE680K	BTS-68	
R140	68Ω	1	RC20AE680K	BTS-68	
R141	56Ω	1	RC20AE560K	BTS-68	
R142	68Ω	1	RC20AE680K	BTS-68	
R143	3500Ω	5	V-1328-15		
R144	75Ω	5	V-1328-14		
R145	1 Ω	1	KRL31R2K		
R146	1 Meg	1	RC20AE105K		
R147	8 Meg	1.5	V-12976-1		
R148	4700Ω	1	RC30AE472K	BTS-4700	
R149	2 Ω	1	KRU32R2K		
R150	50Ω		RC30AE100K		
R151	2 Ω	1	RBU32R2K		
R152	22 Meg	1.5	V-12976-2		
R153	100 Meg	2	V-12976-3		
R154	80Meg	1.5	V-12976-4		
R155	2.2Meg		RC20AE225K	BTS-2.2Meg	
R156	100Ω		RC20AE101K	BTS-1000	
R157	27kΩ		RC20AE273K	BTS-27K	
R158	1000Ω		RC30AE102K	BTS-1000	
R159	100Ω		RC30AE101K	BTS-100	
R160	68KΩ		RC20AE683K	BTS-68K	
R161	33KΩ		RC30AE333K	BTA-33K	
R162	3300Ω		RC20AE332K	BTS-3300	
R163	220KΩ		RC20AE224K	BTA 220K	
R164	56KΩ		RC30AE563K	BTS-56K	
R165	270KΩ		RC30AE274K	BTA-270K	
R166	1500Ω		RC20AE152K	BTS 1500	
R167	56Ω		A47-500-S	AB-4	
R168	27KΩ		RC20AE273K	BTS-27K	
R169	270Ω		RC20AE271K	BTS 270	
R170	10KΩ		RC20AE103K	BTS-10K	
R171	6800Ω		RC20AE682K	BTS-6800	
R172	2200Ω		RC20AE222K	BTS-2200	
R173	470KΩ		RC20AE474K	BTS-470K	
R174	470KΩ		RC20AE474K	BTS-470K	
R175	100KΩ		RC20AE104K	BTS-100K	
R176	4700Ω		RC20AE472K	BTS-4700	
R177	4 TMeg		RC20AE475K	BTS-4 TMeg	
R178	100 Meg		RC20AE107M		
R179	560Ω		RC20AE561K	BTS-560	
R180	270Ω		RC20AE271K	BTS-270	
R181	3900Ω		RC20AE392K	BTS-3900	
R182	150KΩ	1/2	RC20AE154K	BTS-150K 5%	
R183	47KΩ		RC30AE473K	BTS-47K	
R184	47KΩ		RC30AE473K	BTA-47K	
R185	33KΩ			BTA-33K	
R186	100Ω		RC20AE101K	BTS-100	
R187	47Ω		RC20AE470K	BTS-47	
R188	220Ω		RC20AE221K	BTS-220	
R189	10KΩ		RC20AE103K	BTS-10K	
R190	10KΩ		RC20AE103K	BTS-10K	
R191	15KΩ		RC20AE153K	BTS-15K	
R192	150Ω		RC20AE151K	BTS-150	
R193	220Ω		RC20AE221K	BTS-220	
R194	10KΩ		RC20AE103K	BTS-10K	
R195	10KΩ		RC20AE103K	BTS-10K	
R196	18KΩ	2	RC40AE183K	BTB-18K	
R197	18KΩ	2	RC40AE183K	BTB-18K	
R198	15KΩ		RC20AE153K	BTS-15K	
R199	4700Ω		RC20AE472K	BTS-4700	
R200	4700Ω		RC20AE472K	BTS-4700	
R201	15KΩ		RC20AE153K	BTS-15K	
R202	56000Ω		RC20AE563K	BTS-5600	
R203	33KΩ		RC20AE333K	BTS-33K	
R204	15KΩ		RC20AE153K	BTS-15K	
R205	2200Ω		RC20AE222K	BTS-2200	

* Items R107A, R107B, R107C, R107D, C100A, C100B, C100C, C100D are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC 2	Westinghouse PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordarson PART No
T1	117VAC @4.35A	968VCT @.220ADC @3A tap @ 570VCT .220ADC	5VAC @9A	V-12968						
	SEC 3	SEC 4	SEC 5							
	6VAC @8A	12VCT @7.7A	6.3VAC @.6A							
			SEC 6 6.3VAC @2.2A							

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	Westinghouse PART No	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordarson PART No
T2	Horiz. Output Trans.	V-12977-1						
T3	Vert. Output Trans.	V-6981-6	A-8143	A-3038	A-99X	243T1	21802	26S33
		V-6981-7 ①						
T4A	Yoke-Horiz.(12.5MH)	V-12982-1 ②				223D1		
B	Vert. (100MH)							
T5	Horiz. Lin. Coil (1-92MH)	V-12975-1						
T6	Width Coil (18-78MH)	V-12974-1				218R1		WC-19 ④

(CONT'D ON NEXT PAGE)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMERS (SWEEP CIRCUITS cont)

ITEM No.	USE	REPLACEMENT DATA						
		Westinghouse PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T7	Purity Coil	V-12959-1 ⑤						
T8	Field Neutralizing Coil	V-12979-1 ⑤				225D1		
T9	Horiz. Dynamic Convergence Phase Coil (5.3-40MH)	V-14001-1				216R1		
T10	Horiz. Dynamic Convergence Output Trans	V-14000-1				242T1		
T11	Vert. Dynamic Convergence Output Trans.	V-14002-1				241T1		

① Alternate vertical output transformer.
② Includes: Resistors R269, R270, R271, capacitor C193 and male plug part #V-14254-1.
③ Two windings, bifilar.
④ Drill new mounting hole.
⑤ Includes male plug, part #V-14105-1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T12	6.2KΩ	3.6Ω	V-9238D-1 V-9238-1 ①	A-3850	A-3032 ②	S-51X	Z1000	22S46	① Alternate output trans. ② Tape blue-white and red-yellow leads.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	VIKING PART No.	QUAM PART No.	
SP1	10"	PM	3.6Ω	V-9770-1	10J11	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coils	0ΩCT	0Ω					
L2	Neutr. Coil	0Ω						
L3	RF, Mixer Grid & Osc. Coils	0Ω						
L4	Fil. Choke	0Ω						
L5	Conv. Plate	.2Ω	.1Ω					
L6	1st Video IF	.1Ω		V-14319-1				Includes trap, coupling coil, & capacitors
L7	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L8	2nd Video IF	.5Ω	.4Ω	V-9879-1	17-4531 †		6231	
L9	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L10	39.75MC Trap	0Ω		V-14061-3	20-1046			
L11	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L12	3rd Video IF	.5Ω	.4Ω	V-9879-1	17-4531 †		6231	
L13	47.25MC Trap	0Ω		V-14061-3	20-1047			
L14	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L15	4th Video IF	.5Ω	.4Ω	V-9879-1	17-4531 †		6231	
L16	Series Peaking Coil	4.4Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries
L17	Shunt Peaking Coil	1.2Ω		V-4886-1	19-1005	TV-180	4624	14 Microhenries
L18	3.58MC Bandpass Coil	2.7Ω		V-14056-1			1470	
L19	3.58MC Trap	0Ω		V-14025-1				
L20	Shunt Peaking Coil	4.4Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries
L21	Series Peaking Coil	4.4Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries
L22	1st Sound IF	.6Ω		V-9882-5	17-3400	TV-151	1470	
L23	2nd Sound IF	.6Ω		V-9882-5	17-3400	TV-151	1470	
L24	3rd Sound IF	1.7Ω		V-9882-2	17-3400	TV-151	1470	
L25	RF Choke	13Ω		V-9915-2	19-3300		4648	350 Microhenries
L26	Quadrature Coil	6Ω		V-11396-1	17-1031		1470-A	
L27	Horiz. Osc.	75Ω		V-6764-1	19-1576	TV-163	6210	
L28	RF Choke	3Ω		V-9099-2	19-1003		4608	3.3Microhenries; IRC Part # CLA
L29	RF Choke	3Ω		V-9099-2	19-1003		4608	3.3 Microhenries; IRC Part # CLA
L30	RF Choke	3Ω		V-9099-2	19-1003		4608	3.3 Microhenries; IRC Part # CLA
L31	3.58MC Band Pass	2.1Ω		V-14056-2			1470	
L32	3.58MC Bandpass	2.5Ω	1.7Ω	V-12963-1				
L33	Hue Control	3.8ΩCT		U-12964-1				
L34	RF Choke	10Ω		V-12962-1	19-3500	TV-188	6174	500 Microhenries
L35	RF Choke	10Ω		V-12962-1	19-3500	TV-188	6174	500 Microhenries
L36	3.58MC Osc. Coil	.7Ω	1.7Ω	V-12965-1				
L37	RF Choke	10Ω		V-12962-1	19-3500	TV-188	6174	500 Microhenries
L38	Quadrature Phasing Trans	2.3Ω	2.5Ω	V-12966-1				Pri. tapped ⓐ .8Ω
L39	B-Y Bandpass	20Ω		V-14056-4				1.8-2.8Millihenry
L40	3.58MC Trap	5.5Ω		V-9883-3			1470	
L41	R-Y Bandpass	20Ω		V-14056-4				1.8-2.8Millihenry
L42	3.58MC Trap	5.5Ω		V-9883-3				
L43	Series Peaking Coil	4.4Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries
L44	Series Peak. Coil	4.4Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries
L45	Series Peak. Coil	4.4Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries

† Detune trap.

PARTS LIST AND DESCRIPTIONS (Continued)

PROPERTY OF
E. F. BLANKENSHIP
3924 MERRIMOUNT
DENVER

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	Westinghouse PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L46	.220ADC	42.6Ω	1.46 Hy.	V-6471H-2	C-2326 ①	C-2974	C-23X①	C5037 ①	26C44 ①
L47	.320ADC	46Ω	1.56 Hy.	V-12988-1	C-2334 ①			C5037 ①	

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Westinghouse PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3/8A 250V	V-6171-10	V-11966-1	312.375 (3AG-3/8A)	357001	AGC 3/8	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Westinghouse PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	1N64	V-10916-1	1N60, 1N132	1N64A	Video detector (part of M8)
M3	1N64	V-10916-1	1N60, 1N132	1N64A	Sound IF detector (part of M7)

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M4	Dial light		# 47 bayonet
M5	Tuner		
M6	Trap		Antenna filter assembly
M7	Sound IF Detector Assembly	V-14066-1	Complete with all parts shown within dotted line.
M8	Video detector Assembly	V-12846-1	Complete with all parts shown within dotted line.
M9	Switch	V-5406	Red gun cathode
M10	Switch	V-5406	Blue gun cathode
M11	Switch	V-5406	Green gun cathode
M12	Delay line	V-15540-1	
M13	Magnet		Beam positioning (3 used)
A44	Trimmer cap	V-12961-1	Chroma sync phase detector (1-3.5MMF)
A45	Trimmer cap	V-11228-3	2nd Video Amp. cathode 3.58 MC trap (100-580MMF)
B2	Trimmer cap	V-11228-2	Horizontal range-(5-80MMF)
	Cabinet	V-1360-1	
	Knob	V-14041-2	Control door
	Knob	V-12081-3	12 Pos. channel selector assembly
	Knob	V-11963-3	Fine tuning
	Knob	V-12063-1	Off-on volume
	Knob	V-14065-1	Picture and color
	Knob	V-11979-3	Tone
	Safety glass	V-14057-1	
	Lens	V-12646-1	Channel selector window
	Rubber tips	V-11711-1	For concealed controls

MISCELLANEOUS ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

When necessary the horizontal oscillator coil may be adjusted as follows:

Short out the horizontal oscillator coil, L27, with a short jumper. Set the horizontal hold control to its mid-range position. Connect the DC probe of a VTVM to the junction of R109 and C121. Connect the common lead to chassis. Adjust the horizontal multivibrator trimmer (B2) for zero reaching on VTVM. If zero can be approached but not quite reached it may be necessary to re-set the horizontal hold control slightly to one side of mid-range so that zero reading can be obtained on VTVM.

Remove the jumper from across the horizontal oscillator coil.

Adjust the horizontal oscillator slug (B1) for zero reading on VTVM.

Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

HIGH VOLTAGE REGULATOR ADJUSTMENT

Place the high voltage probe (used with VTVM) on pin 7 of the 1B3 output rectifier (V28) and adjust the high voltage control (R33) for 20KV output.

Check the setting of R33 by varying the brightness from minimum brightness to maximum brightness. If more than a slight change in high voltage occurs slightly readjust R33A and recheck as above.

COLOR PURITY ADJUSTMENT

Switch the channel selector to an unused channel.

Switch to "off" Position the blue and green gun cathode switches (on rear chassis apron).

Loosen the yoke assembly and slide the unit back approximately 3 inches.

Simultaneously adjust the color-purity control (R12) and rotate the purity coil rotation adjustment to obtain the most uniform red in the center area of the tube face.

Slide the deflection yoke forward until the entire screen area is uniformly red. Check to see that no neck shadows are present then secure the yoke in this position by retightening the screws. If necessary, adjust the field neutralizing control (R18) to obtain better purity around the edges of the raster.

Check the blue purity by switching off the red gun and switching on the blue gun. Check the green purity by switching off the blue gun and switching on the green gun.

BLACK AND WHITE BALANCE ADJUSTMENTS

The following adjustments are necessary to produce a white raster without large area color contamination in a black and white picture. Increasing or decreasing the brightness should result in no change in black and white balance under normal operating conditions.

Turn the color control (R17A) fully counter clockwise.

Turn the picture control (R2A) fully counter clockwise.

Turn the brightness control (R11) fully clockwise.

Adjust the red, blue and green screen controls for a bright gray raster. NOTE: The red, blue, and green screen controls (front panel) should not be set too high (clockwise) or color will dominate the raster. Other indications of incorrect settings of these controls are:

a. Low red screen control setting produces a greenish blue raster.

b. Low blue screen control setting produces a yellowish white raster.

c. Low green screen control setting produces a purple raster.

With brightness control fully clockwise, turn picture control clockwise until a picture begins to appear.

Turn the blue and green gain controls clockwise until white appears on the high-brightness highlights in the picture.

Reduce the brightness by turning the brightness control counter clockwise. Adjust blue and green background controls until equal grays are obtained in the picture. NOTE: Rotation of the green background control should cause the background to vary from purple to green. Rotation of the blue background control should cause the background to vary from blue to yellow.

Check above procedure by varying brightness control over the normal viewing range. The white or gray should not change color. If a color change is noted the entire procedure should be repeated.

HORIZONTAL DYNAMIC CONVERGENCE ADJUSTMENT

Set the vertical dynamic convergence control (R20A) fully counter clockwise. Set the horizontal dynamic convergence control (R14A) fully clockwise.

Connect the vertical amplifier of an oscilloscope thru a 500MMF / 20KV capacitor to the junction of C111 and C113 and adjust the horizontal dynamic convergence output transformer slug (A51) for maximum response on scope.

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CONVERGENCE ADJUSTMENTS

Connect the RF output of a white dot generator across the antenna terminals.

Turn dynamic convergence amplitude controls fully counter clockwise.

Adjust picture control and brightness control until dots appear on screen.

Adjust the DC convergence control until the three dots are positioned in a triangular pattern in the center of the raster (It is possible to invert the dot triangle by turning the DC convergence control from one extreme to the other.

If the dot group cannot be made to form an equilateral triangle similar to Fig. 17, adjust the beam positioning magnets on the neck of the picture tube. Note which of the three dots requires positioning , then adjust positioning magnet (small threaded screw with knurled nut) corresponding to that color to correct the position of that dot. The solid lines indicate direction of dot movement when associated beam positioning magnet is adjusted. The dashed lines indicate direction of dot movement due to DC convergence control adjustment. Minimum adjustment of the magnets is desirable due to interaction on other beams.

Minimum adjustment is that point nearest the extreme counter clockwise position where correct beam positioning is obtained. If indications are that only one dot is out of line and the associated magnets has insufficient range of adjustment remove the magnet from the neck shield and re-insert the opposite end of the magnet in the neck shield.

After obtaining the equilateral triangle, complete convergence should be obtained at the center of the raster by adjustment of the DC convergence control. Complete convergence is indicated when a single dot with no color fringing around its edge is obtained.

Adjust the vertical dynamic convergence control (R20A), the vertical dynamic convergence shape control (R16A), the horizontal dynamic convergence control (R14A) and the horizontal convergence phasing coil slug (A50) for best convergence at the edges of the raster.

Readjust the DC convergence control for best convergence at the center of the raster.

Check color purity. If necessary readjust the color purity control (R12).

Switch off the blue and green guns and adjust the field neutralizing control (R18) for a pure red raster. Varying R18 will show color contamination around the edges of the raster. Adjust R18 for minimum color contamination.

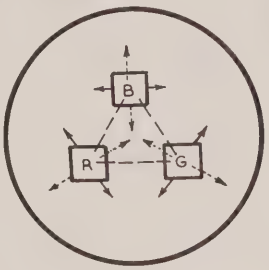


FIG. 17

MATRIX ADJUSTMENTS (USED ONLY WHEN COLOR BAR SIGNAL GENERATOR IS NOT AVAILABLE)

1. Switch the channel selector to an unused channel.
2. Connect the high side of signal generator to point Ⓐ . Low side to chassis. Adjust generator to provide a 1 volt 100KC signal at point Ⓐ
3. Remove the band pass amplifier tube (6BA6/V30) from its socket.
4. Connect the vertical amplifier of oscilloscope to point Ⓓ . Low side to chassis. Adjust picture control for 1 volt peak to peak on scope. Do not alter setting of picture control after it has been adjusted.
5. Replace V30 (6BA6) in its socket and remove the video amplifier tube (6BK5 / V8) from its socket.
6. Adjust the generator for a 1 volt, 3.4MC, signal at point Ⓐ .
7. Adjust color control (R17A) for 1.2 volts peak to peak on scope.
8. Move the high side of scope to point Ⓔ and adjust the B-Y gain control (R27A) for 1.4 volts peak to peak on scope.
9. Remove V34 (6DB6 or 6AS6) from its socket. Move the high side of scope to point Ⓕ .
10. Adjust the G-Y gain control (R28A) for 0.6 volts peak to peak on scope.
11. Replace V34 and remove V35 (6DB6 or 6AS6) from its socket.
12. Adjust G-Y matrix control (R31A) for 0.4 volts peak to peak on scope. Replace V35 and V8 in their sockets.

MATRIX ALIGNMENT USING FULLY SATURATED COLOR BARS

Connect a color bar generator to the antenna terminals, or use a transmitted signal composed of color bars.

Connect the vertical input lead of an oscilloscope to the red test point.

Set the contrast control to the mid-position of its range.

Adjust the color control until all the bars on the oscilloscope containing red are of equal amplitude, All other bars should be at zero amplitude.

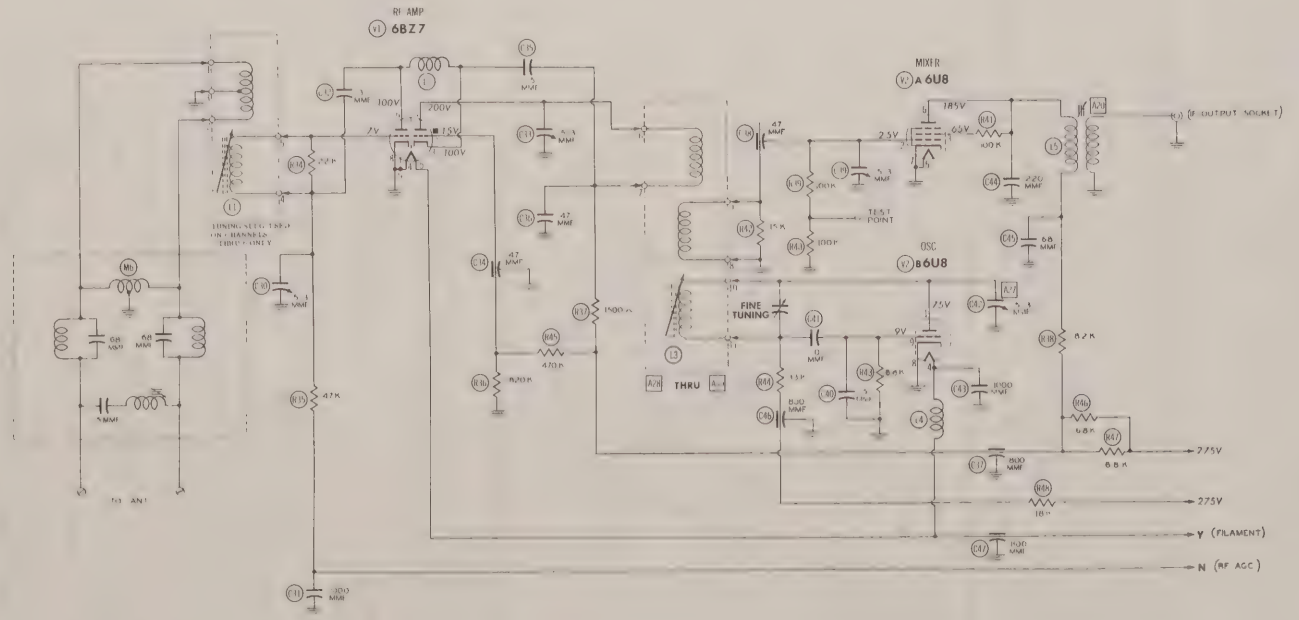
Connect the oscilloscope input lead to blue test point.

Adjust the B-Y gain control until all the bars containing blue are of equal amplitude, all other bars should be at zero amplitude.

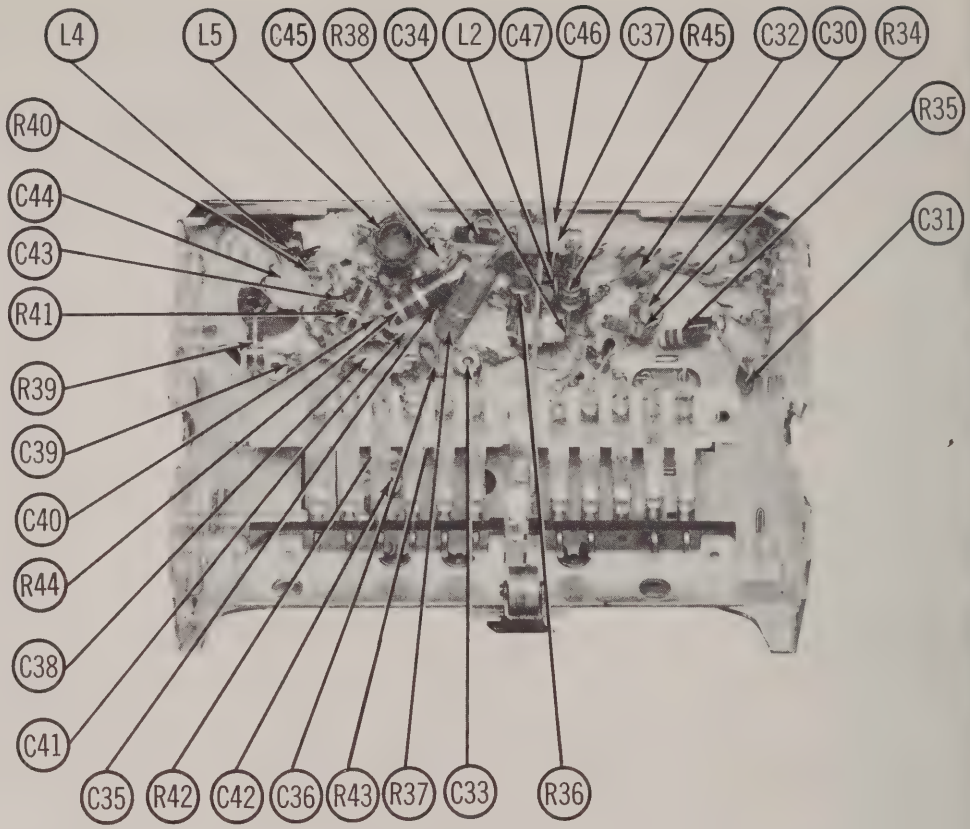
Connect the oscilloscope input lead to green test point.

Adjust the G-Y matrix and G-Y gain controls until all the bars containing green are of equal amplitude.

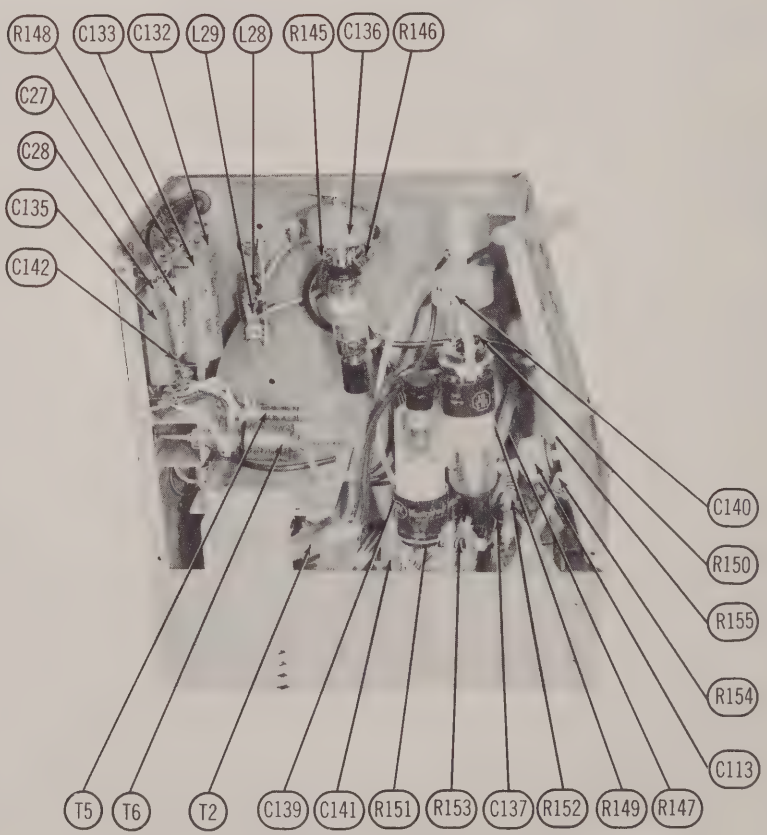
All other bars should be at zero amplitude.



RF TUNER SCHEMATIC



RF TUNER-BOTTOM VIEW



HIGH VOLTAGE COMPARTMENT

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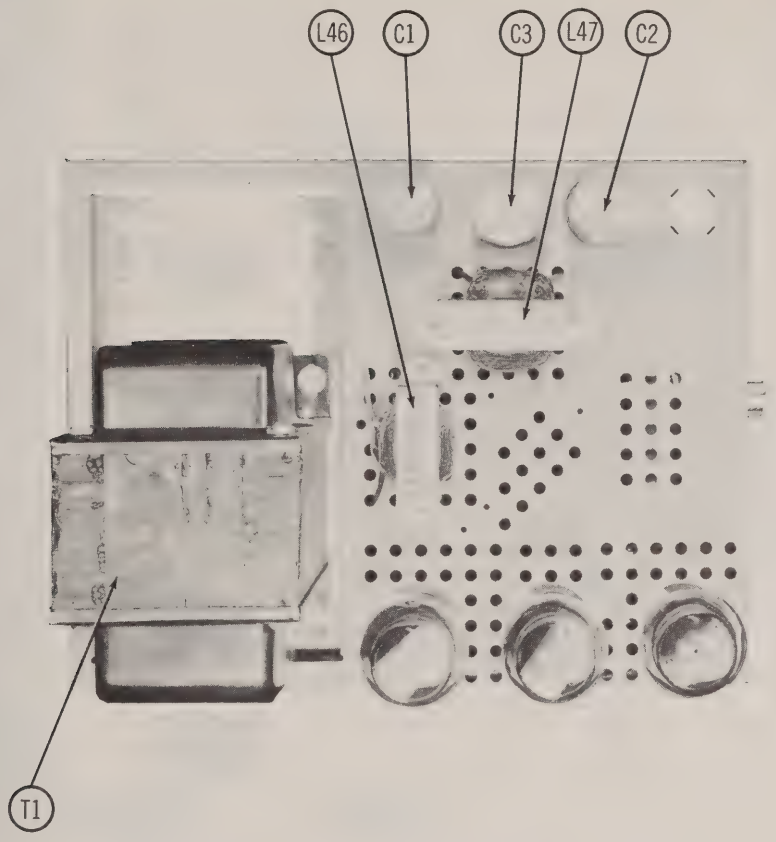
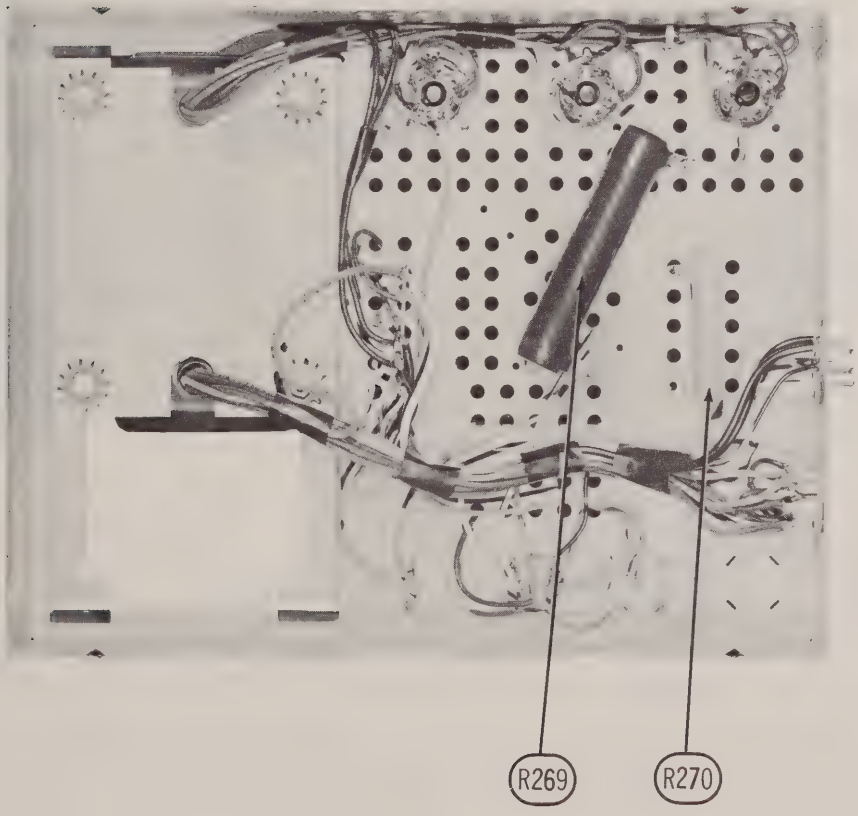


POWER SUPPLY CHASSIS-TOP VIEW



POWER SUPPLY CHASSIS-BOTTOM VIEW

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MODEL M1800R

ZENITH CHASSIS
19M20, U, Z, 19M21, U, UZ, Z

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ZENITH MODEL M1800R

TRADE NAME	Zenith	MODELS	CHASSIS
		M1800E, M1800R, R1800EZ, R1800RZ, R1812EZ, R1812RZ, M1800EU, M1800RU, R1800EUZ, R1800RUZ, R1812EUZ, R1812RUZ	19M20
		M1800EZ, M1800RZ	19M20U
		M2228R, M2229E, M2229R, M2230E, M2230R, M2230RZ2, M2249E, M2249R, M2250E, M2250R, M2252E, M2252R, R2229EZ, R2229RZ, R2230EZ, R2230RZ, R2249EZ, R2249RZ, R2250EZ, R2250RZ, R2257EZ, R2257RZ, R2258EZ, R2258RZ	19M20Z
		M2228RU, M2229EU, M2229RU, M2230EU, M2230RU, M2249EU, M2249RU, M2250EU, M2250RU, M2252EU, M2252RU, R2229EUZ, R2229RUZ, R2230EUZ, R2230RUZ, R2249EUZ, R2249RUZ, R2250EUZ, R2250RUZ, R2257EUZ, R2257RUZ, R2258EUZ, R2258RUZ	19M21
		M228RZ, M2229EZ, M2229RZ, M2230EZ, M2230RZ, M2249EZ, M2249RZ, M2250EZ, M2250RZ, M2252EZ, M2252RZ	19M21U
		M2250RUZ	19M21Z
			19M21UZ

MANUFACTURER Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET Television Receiver
TUBES Nineteen
POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 1.6 Amp. @ 117 Volts AC
TUNING RANGE Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75 MC, Sound IF 41.25 MC (Intercarrier)

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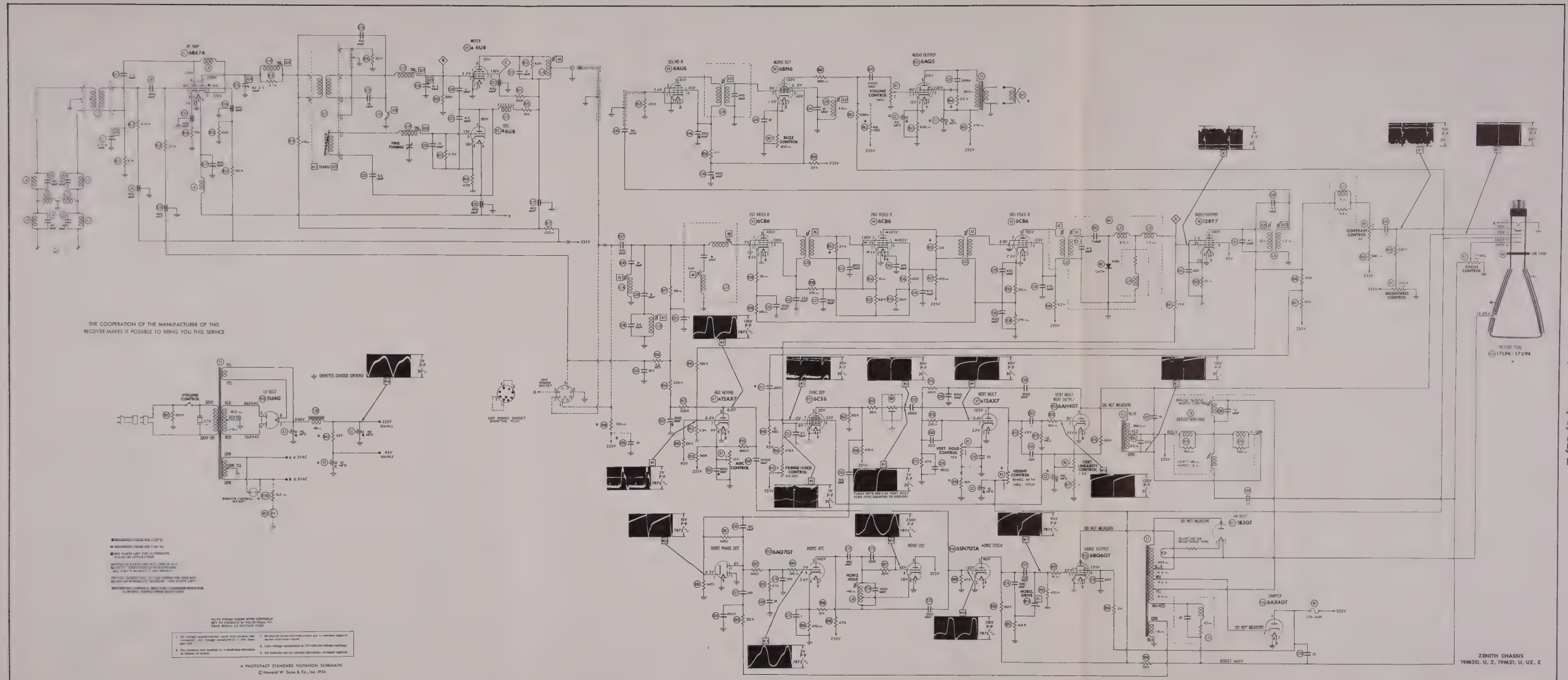
19M20, U, Z, 19M21, U, UZ, Z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CHASSIS TOP VIEW

CHASSIS 19M20, U, Z, 19M21, U, UZ, Z
ZENITH

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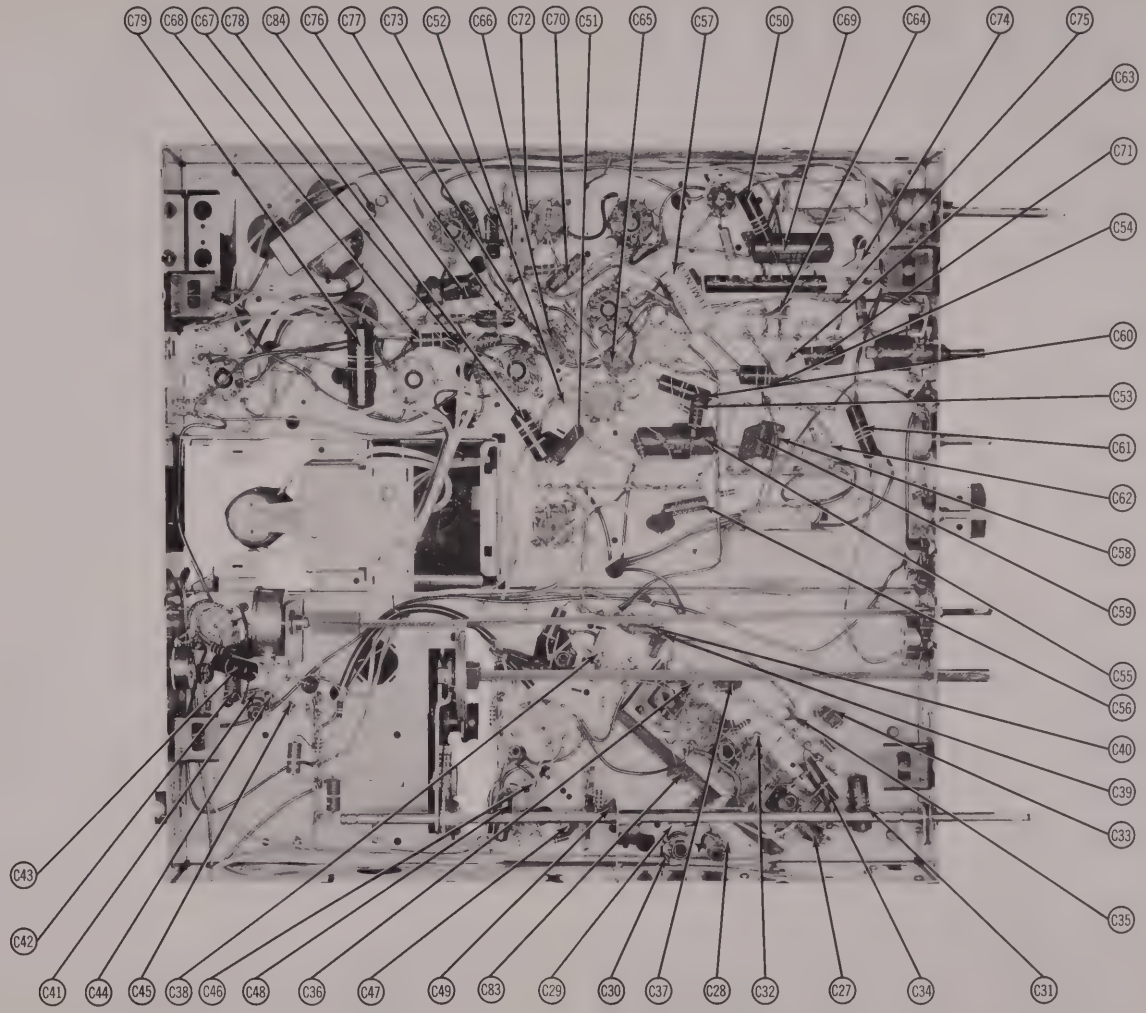

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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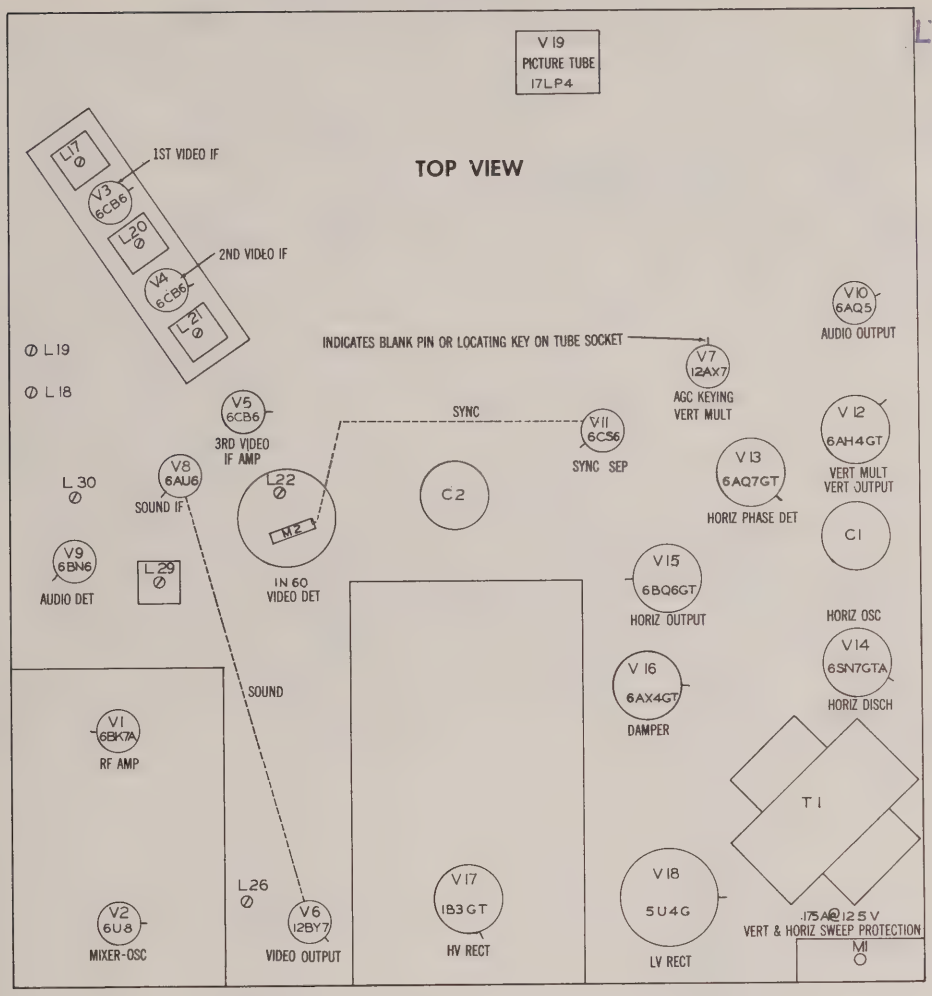

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V18

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V19
Has pic, no sound - V8, V9, V10
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V7, V11
No horiz. sync - V11, V13, V14
No vert. or horiz. sync - V11

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19, Fuse (M1)
No vertical deflection - V7, V12
Poor vert. linearity or foldover - V7, V12
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V16, V17, V18
Vert. off freq. - V7, V11
Horiz. off freq. - V11, V13, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V14) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt bias supply to the ungrounded side of C31.
Connect the positive side to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	43MC (10MC Swp)	39.75MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1, A2	Attenuate generator output for 3 volts peak to peak on scope. Adjust for response curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	High side to point Ⓑ. Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5	Remove bias battery. Use maximum scope gain to amplify trap region of response curve as in Fig. 2. Adjust for MINIMUM marker amplitude. Reconnect bias supply.
3.	"	"	"	42.75MC 45.0MC 45.75MC	"	"	A6, A7, A8, A9	Attenuate sweep generator output to maintain not more than 3 volts peak to peak on scope. Alternately adjust A6 thru A9 to obtain response similar to Fig. 3. A6 affects the high side and A7 affects the low side of the response curve.

OSCILLATOR ALIGNMENT

The master oscillator adjustment, A10, is to be made only if the individual channel oscillator adjustment fails to bring the channel within the range of the fine tuning control. If channels 2 thru 6 fall within the range of the fine tuning control but the higher channels do not, slight adjustment of A10 may be necessary to bring in the higher channels.
Connect the negative lead of the bias supply to the ungrounded side of C31. Connect the positive lead to chassis. Adjust for -1 volt at C31.
Turn up the scope gain so that the sound trap notch in the response curve becomes visible.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	59.75MC	2	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis	A11	Adjust to place sound marker in trap notch as in Fig. 4.
			63MC (10MC Swp)	65.75MC	3		A12	
			69MC (10MC Swp)	71.75MC	4		A13	
			79MC (10MC Swp)	81.75MC	5		A14	
			85MC (10MC Swp)	87.75MC	6		A15	
			177MC (10MC Swp)	179.75MC	7		A16	
			183MC (10MC Swp)	185.75MC	8		A17	
			189MC (10MC Swp)	191.75MC	9		A18	
			195MC (10MC Swp)	197.75MC	10		A19	
			201MC (10MC Swp)	203.75MC	11		A20	
			207MC (10MC Swp)	209.75MC	12		A21	
			213MC (10MC Swp)	215.75MC	13		A22	

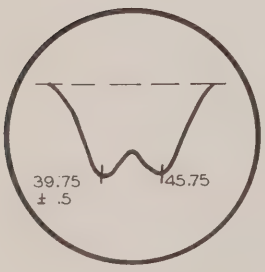

FIG. 1

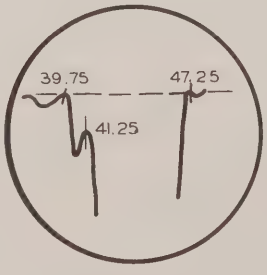

FIG. 2

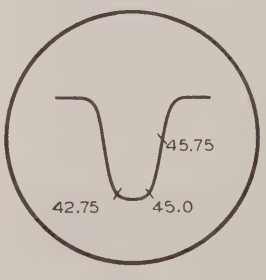

FIG. 3

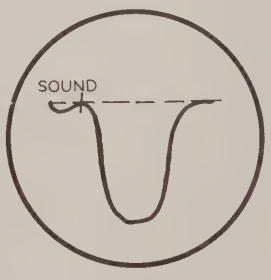

FIG. 4

ALIGNMENT INSTRUCTIONS (cont)

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RF AND MIXER ALIGNMENT

Remove the bias supply from C31 and connect a jumper from the tuner AGC lead (yellow) to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp)	67.25MC 71.75MC	4	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A23, A24, A25	Adjust for response similar to Fig. 5.
6.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A26, A27, A28	Adjust A26 and A27 for symmetrical response similar to Fig. 6. Adjust A28 for proper band width. Repeat steps 5 and 6 until best overall symmetrical response is obtained. Remove jumper from tuner AGC terminal to chassis.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna.
Tune in a tone modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the 6BN6 limiter detector, as evidenced by a hiss similar to superregeneration.
Adjust the sound take-off transformer (A29, A30) the sound IF transformer (A31) and the quadrature coil (A32) for maximum sound of best quality.
Adjust the buzz control (R9) for minimum intercarrier buzz.
If the intercarrier buzz cannot be eliminated with the buzz control check the setting of the AGC delay control adjustment.
If during the sound IF alignment the signal rises above the limiting level (hiss disappears) increase the attenuation until the hiss returns.

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available.
Switch the receiver to the UHF position.
Connect the negative lead of a 2 volt bias supply to the ungrounded side of C31. Connect the positive lead to chassis.
Adjust the sweep generator output to provide 3 volts peak to peak on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Fig. 8	Across UHF antenna terminals thru matching network (Fig. 8).	713MC (10MC Swp)	711.25MC	54	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A33, A34, A35	Tuner rocket arm should be in the horizontal position. If necessary, loosen set screw and adjust tuner shaft so that rocker arm is horizontal when the channel indicator is set to channel 54. Do not adjust A33 unless oscillator calibration is off more than three channels. If necessary, adjust A33 to place video market at 50% on response curve as in Fig. 7. The image (weaker response) will appear also. The response toward the counter clockwise position of A33 is the correct response. Adjust A34 and A35 for maximum amplitude and symmetry of response similar to Fig. 7.
8.	"	"	473MC	471.25MC	14	"		Check for response similar to Fig. 7. If oscillator is off more than 3 channels adjust the oscillator travel (osc., mixer and ant. travel adjustments are the three round thumb screws on top of tuner) adjustment to scale. Care must be used in making this adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
9.	"	"	887MC (10MC Swp)	885.25MC	83	"	A36, A37, A38	Adjust A36 to place video marker at 50% as in Fig. 7. Adjust A37 and A38 for maximum amplitude and symmetry of response similar to Fig. 7.

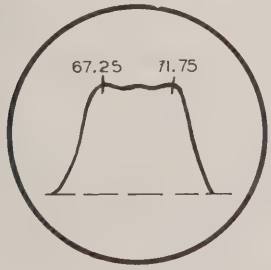


FIG. 5

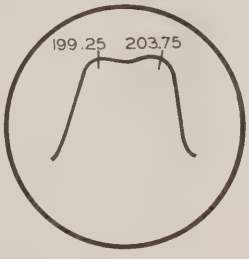


FIG. 6

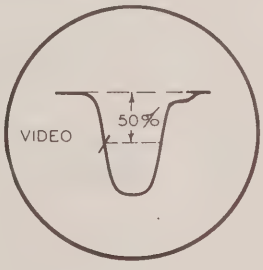


FIG. 7

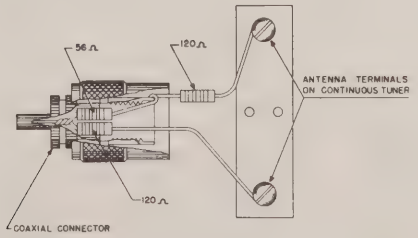
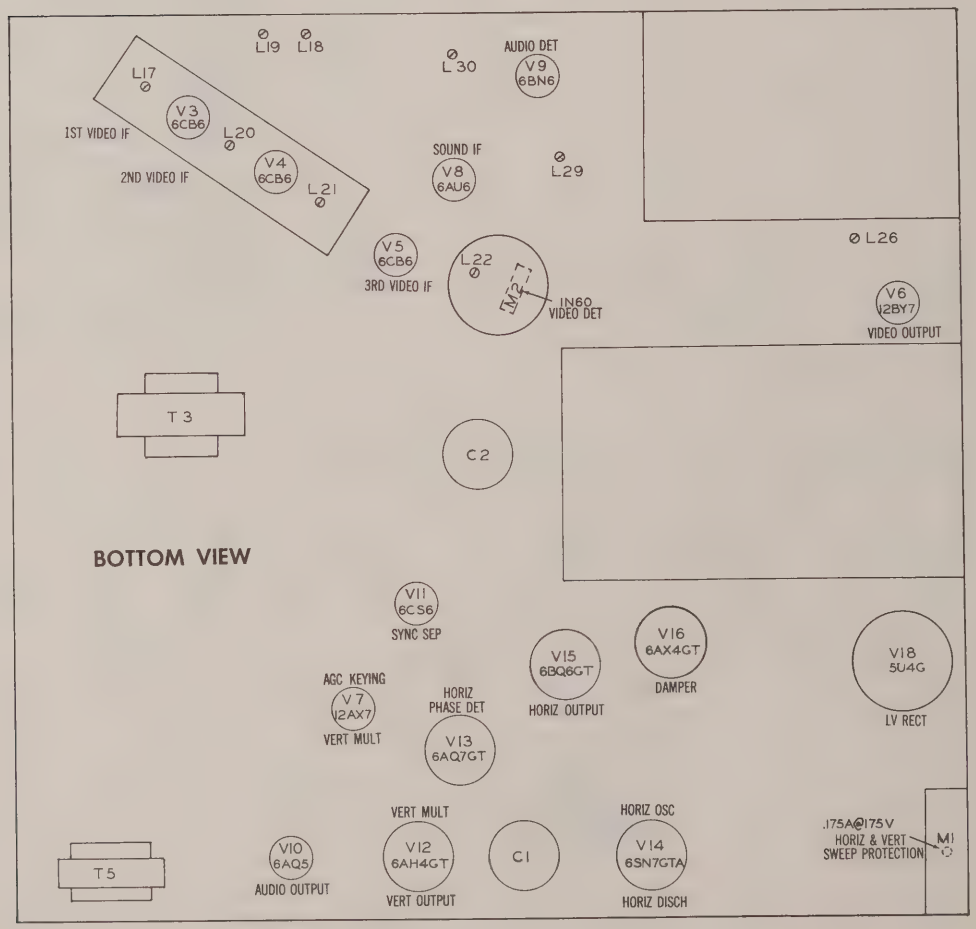


FIG. 8

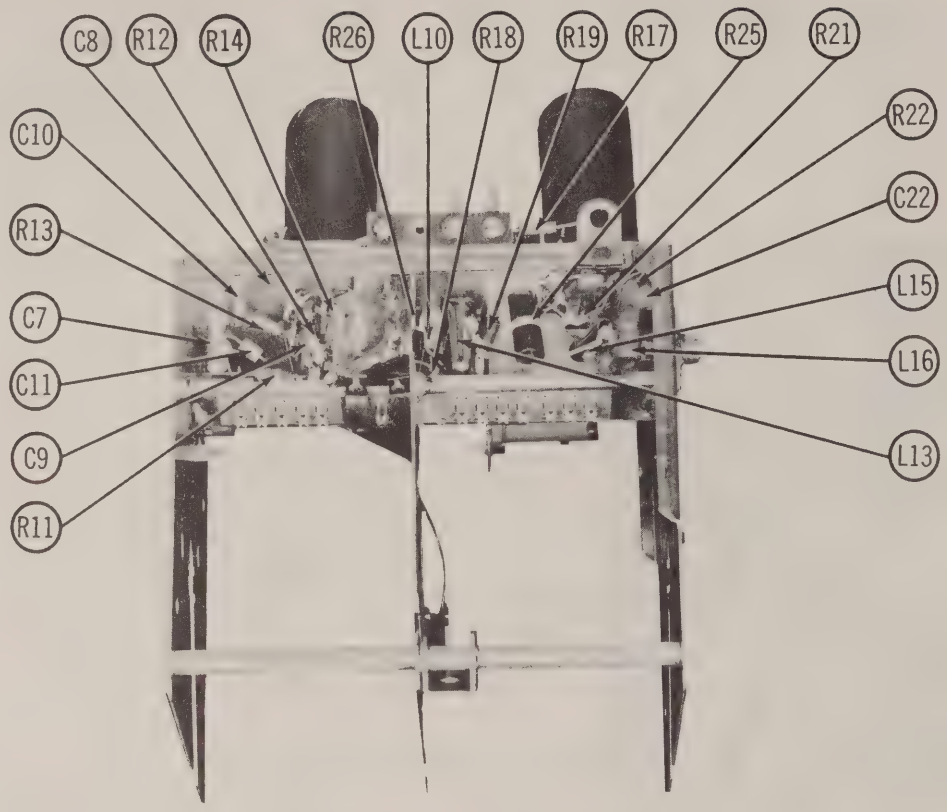
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	†750Ω	60KΩ	INF	.1Ω	0Ω	INF	3.3Meg	47Ω	0Ω
V 2	6U8	†10.3KΩ	68KΩ	†100KΩ	.1Ω	0Ω	†300Ω	0Ω	2.2KΩ	4.4KΩ
V 3	6CB6	1.1Meg	500Ω	.1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V 4	6CB6	80KΩ	80KΩ	.1Ω	0Ω	†500Ω	†500Ω	80KΩ		
V 5	6CB6	270Ω	420Ω	.1Ω	0Ω	†8.2KΩ	†8.2KΩ	0Ω		
V 6	12BY7	15Ω	3KΩ	15Ω	0Ω	0Ω	.1Ω	†5KΩ	†22KΩ	15Ω
V 7	12AX7	■5Meg	270KΩ	40KΩ	0Ω	0Ω	†800KΩ	3.9KΩ	7.5KΩ	.1Ω
V 8	6AU6	100KΩ	0Ω	.1Ω	0Ω	†32KΩ	†32KΩ	0Ω		
V 9	6BN6	350Ω	.3Ω	.1Ω	0Ω	†22KΩ	4.6Ω	■680KΩ		
V 10	6AQ5	350KΩ	680Ω	0Ω	.1Ω	1.4KΩ	†500Ω	350KΩ		
V 11	6CS6	19KΩ	0Ω	.1Ω	0Ω	†100KΩ	1.8KΩ	†10Meg		
V 12	6AH4GT	1.8Meg	.1Ω	1.8Meg	INF	†460Ω	INF	0Ω	1.8KΩ	
V 13	6AQ7GT	2Meg	1Meg	0Ω	3Meg	†47KΩ	470Ω	.1Ω	0Ω	
V 14	6SN7GTA	47KΩ	■215KΩ	0Ω	32KΩ	†66Ω	10KΩ	0Ω	.1Ω	TOP CAP ■9.4Ω
V 15	6BQ6GT	†12KΩ	.1Ω	6.8KΩ	†12KΩ	470KΩ	470KΩ	0Ω	0Ω	
V 16	6AX4GT	INF	INF	700KΩ	INF	†70Ω	■4.2Ω	.1Ω	0Ω	
V 17	1B3GT	PINS	1 - 8	HAVE	INFINITE	RESISTANCE				TOP CAP ■414Ω
V 18	5U4G	INF	30KΩ	†66Ω	16Ω	INF	18Ω	INF	30KΩ	
V 19	17LP4	0Ω	100KΩ	PIN 6 ■250KΩ	PIN 10 ■33KΩ	PIN 11 †300KΩ	PIN 12 .1Ω			

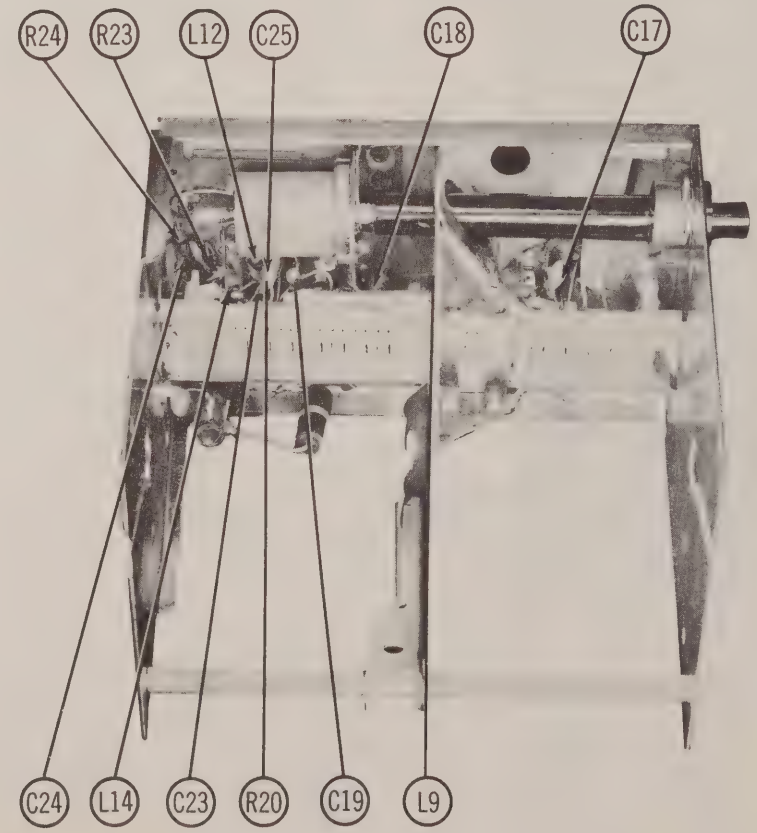
† MEASURED FROM PIN 2 OF V18
▲ MEASURED FROM PIN 7 OF V4
■ MEASURED FROM PIN 3 OF V16



TUBE PLACEMENT CHART

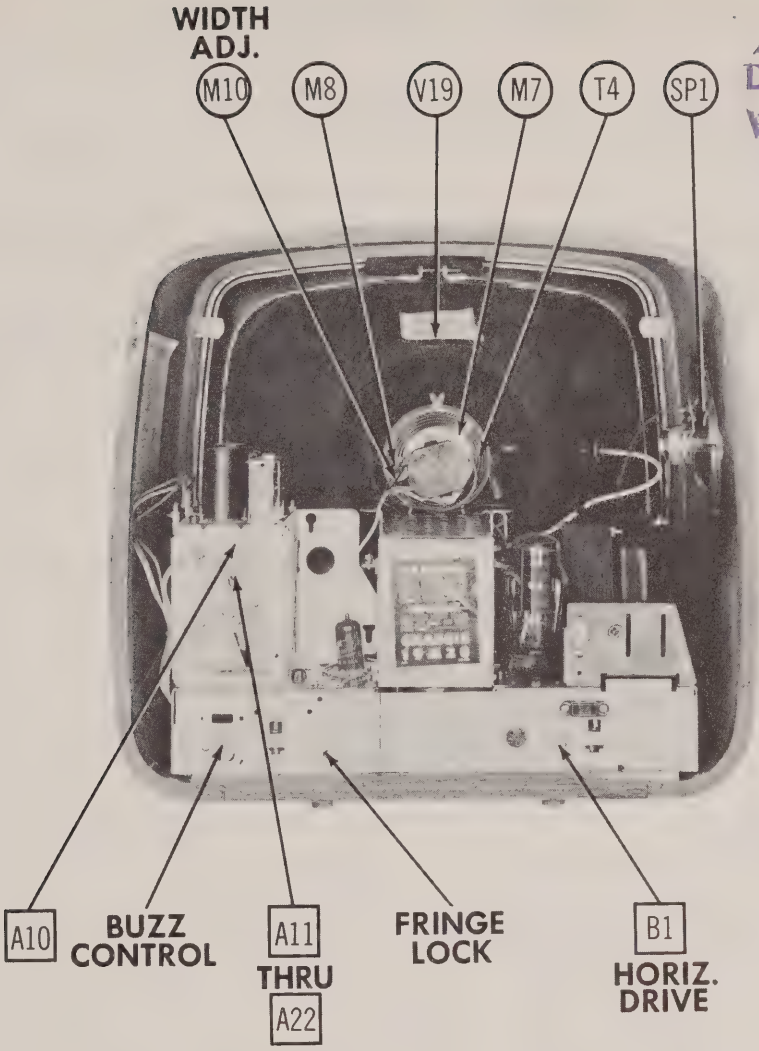


VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control adjustment until the picture synchronizes horizontally.

Adjust the horizontal Drive trimmer (B1) counter clockwise for maximum width.

Adjust the width for a picture slightly wider than necessary to fill the picture mask horizontally by sliding and turning the brass sleeve on the neck of the picture tube.

AGC DELAY CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope through a 10KΩ resistor to point Ⓐ. Low side to chassis.

Select the strongest TV signal available and adjust the AGC delay control for 2. 75 volts peak output.

Satisfactory adjustment may also be obtained by turning the AGC delay control fully clockwise then counter clockwise until picture distorts and buzz is heard in the sound. Turn the AGC delay control slowly clockwise until a stable picture with clear sound is obtained.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V15 and V16. Check adjustment B1. Check T2, T4A, R94, C77, C76 and other associated components.

DRIVE LINES

Check by substitution V14, V15 and V16. Check T2, T4A, R90, R94, C77 and C79. Check adjustment B1 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V15 and V16. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under 'Drive Lines".

PIE CRUST EFFECT

Check by substitution V13, V14, V15 and V16. Check C70 for open. Check L30 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14, V15, and V16. Check L30, C74, C75, C76 C77, R86, R90, R88 and R87. Check T2 and T4A for internal arcing.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V12. Check R3, R72, R6, R77, C57, C54, C2D, T3, T4B and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V12. Check height and vertical linearity controls for proper operation. Check T3 and T4B.

COMPRESSED AT BOTTOM

Check by substitution V7 and V12. Check R3, R75, C57 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V12. Check R6, R77, C2D and other associated components.

FOLDS

Check by substitution V7 and V12. Check R72, C54, T3, T4B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V11. Check C51, C52, R10, R68, R66 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check vertical integator network, check R5, R99, C55 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V13. Check horizontal AFC network. Check R80, C65, C70 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V11 and V13. Check components associated with V13.

VIDEO

LOSS OF VIDEO

Substitute V6. Check R43, L27, R8, R49, C43 and other associated components.

SOUND BARS (4.5 MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A30. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control, picture tube, C43, L27 and C41. Check video detector crystal network.

NEGATIVE PICTURE

Substitute V6. Check video detector crystal network, picture tube, C43, C2C and R49. Check video IF alignment.

SMEAR

Substitute V6. Check video detector crystal network. Check C43, C41, L27, R49 and other associated component.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stages V9 and V10 using audio signal genator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check audio IF and audio detector stages for component failure or change of value.	Check C49, C50, C1C, R65, R60, R63, speaker, T5 and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments R9 and A32 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V18. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V18. Check B+ filter and decoupling network.

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

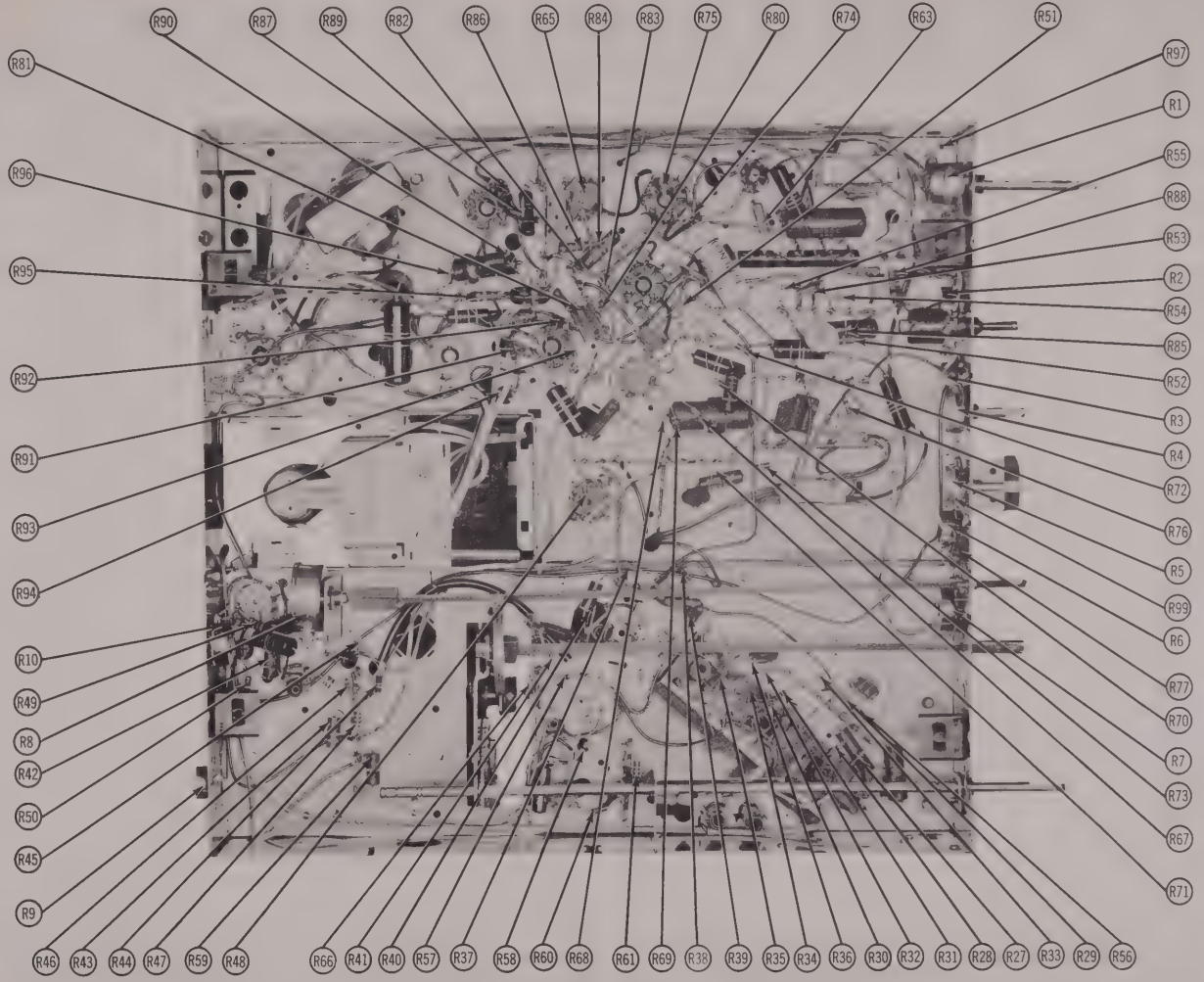
ALTERNATE TUNER SCHEMATIC

CHASSIS 19M20, U, Z, 19M21, U, UZ, Z

ZENITH

RF AMP 6BK7A
MIXER 6U8
OSC 6U8
UHF OSC 6AF4
IF OUTPUT SOCKET
FINE TUNING
THRU
235V
TO VHF POWER SOCKET PIN 5 AND JUNCTION R10 AND C14
UHF IF STRIP
CHANNEL BRACKET
CR710
VHF-UHF TUNER PART NO. 521001 USED ON SOME MODELS
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1954
UHF-VHF CHANGE OVER SWITCH SHOWN IN VHF POSITION
WHEN USING SEPARATE VHF-UHF ANTENNAS, DISCONNECT 3 SWITCH LEADS HERE AND CONNECT VHF ANTENNA TO THESE TERMINALS
TO BE USED WHEN A COMMON VHF-UHF ANTENNA IS USED. (A 300 OHM TWIN LEAD ANTENNA) IF SEPARATE ANTENNAS ARE USED, CONNECT THE UHF ANTENNA TO THESE TERMINALS

PROF
L. F.
3924 MERI
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BK7A	6BK7A	9AJ	
V2	Mixer - Osc.	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	AGC Keying-Vert. Mult.	12AX7	12AX7	9A	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Audio Detector	6BN6	6BN6	7DF	
V10	Audio Output	6AQ5	6AQ5	7BZ	
V11	Sync Separator	6CS6	6CS6	7CH	
V12	Vert. Mult. - Vert. Output	6AH4GT	6AH4GT	8EL	
V13	Horiz. AFC	6AQ7GT	6AQ7GT	8CK	
V14	Horiz. Oscillator-Horiz. Discharge	6SN7GTA	6SN7GTA	8BD	
V15	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V16	Damper	6AX4GT	6AX4GT	4CG	
V17	HV Rectifier	1B3GT	1B3GT	3C	
V18	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V19	17LP4 / 17VP4	17LP4	17LP4 / 17VP4	17LP4 / 17VP4	17LP4	12L	① Aluminized ② Circuit change necessary
	21YP4	21YP4	21YP4	21YP4	12YP4	12L	
	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ① 21AFP4 ②	21YP4A ①	12L 12M	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■40	400	22-2437	AFH3-46		C154		FP378	TVL-4670	
B	▬80	400						TC72		
C	▲30	400								Note 1
C2A	▬40	450								Note 2
B	■10	450	22-2483	AFH4-83		C032		FP396.2	TVL-3762	
C	▲10	400				BRH501		TC3501	TVA-1705	Note 3
D	100	50								Note 4
C3	40		22-2519							
C4	40		22-2519							
C5	40		22-2519							
C6	40		22-2519							
C7	2.5-6		22-2221							
C8	400		22-2401							
C9	800		22-2331	BPD-0008	DD-801	K067	801-0008	UC-538	5GA-T8	
C10	400		22-2401							
C11	2.2		22-2468	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C12	400		22-2401							
C13	400		22-2401							
C14	400		22-2401							
C15	.85-2.3		22-2453							
C16	.6-3		22-2504							
C17	800		22-2331	BPD-0008	DD-801	K067	801-0008	UC-538	5GA-T8	
C18	100		22-2407	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C19	19		22-2406							
C20	2		22-2536	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C21	400		22-2557							
C22	2		22-2536							
C23	4.5		22-2500							
C24	10		22-2411	SI10NP0	TCZ-10	TP09	NP0K-100	ZT-541	5TCC-Q1	
C25	5.5		22-2449							
C26	400		22-2557							
C27	470		22-2217	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C28	24									
C29	9									
C30	6									
C31	.1	400	22-1777	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C32	330		22-2309		TCZ-331					
C33	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	.015	200		P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C35	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C36	470		22-2302	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C37	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	470		22-2524	1469-0005		5R5T47		MCE245	MS-35	
C39	470		22-2217	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C40	1000		22-2112							
C41	47		22-2467							
C42	.022	200	22-1781							
C43	.1	200	22-1777	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C44	3.3		22-2343			TZ06				
C45	50		22-2460			TP30				
C46A	1000		22-2553	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C47	10		22-2378							
C48	.01	200	22-3	P288-01	D6-103	PJ2S1		PT411	2TM-S1	
C49	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C50	.0068	1000	22-2495							
C51	.0033	600	22-1785	P688-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	Note 5
C52	27		22-2396							
C53	.0022	600	22-1845	P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C54	.022	600	22-2129							
C55	.33	200	22-2159	P288-33		PJ2P33		PT4033	2TM-P33	
C56	.0022	600	22-2161							

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C57	.1	600	23-1841	P488-1	DF-104	CUB4P1		PT601	6TM-P1	
C58	1000	500	23-2545	1464-001		1R5D1		MCE-255	MS-31	
C59	1000	500	23-2545	1464-001		1R5D1		MCE-255	MS-31	
C60	.032	200	23-1781							
C61	.033	200	23-1840							
C62	.01	400	23-1845	P488-01	D5-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C63A	1000		23-2545	BPD-3X001	DD2-102	DK069	812-001	DCD-521	5HK-3Z01	
B	1000									
C64	10000		23-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C65	100		23-9	BPD-0001	DD-101	G042	801-0001	UC-531	5GA-T1	
C66	130	500	23-2505	1469-0001		32HS12		MCE235	MS-31	
C67	.001	300	23-1839	P568-001	D5-102	CUB5D1	GP2-333-102	PT831	6TM-D1	
C68	.0047	400	23-1842							
C69	.15	200	23-2166							
C70	.001	300	23-1839	P568-001	D5-102	CUB5D1	GP2-333-102	PT831	6TM-D1	
C71	.1	200	23-1777	P286-1	DF-104	P21P1		PT401	2TM-P1	
C72	680	500	23-2340	1469-0007		1R5T68			MS-37	
C73	.0015	400	23-1785	P488-0015	D5-152	CUB4D15	GP2-333-152	PT4215	4TM-D15	
C74	1000	500	23-2183	1468-001		1R5D1		MCE255	MS-31	
C75	1000		23-2122							
C76	680	500	23-2387							
C77	220		23-2458							
C78	.047	400	23-1775	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C79	.15	400	23-2341							
C80	72	3000								
C81	4.8		23-2523							
C82	1		23-2376							
C83	470			SI470	D6-471		GP1K-471	UC-3347	5GA-4W7	
C84	.15	200		P286-15		P21P15		PT4015	2TM-P15	
C85	.01	200	23-3	P286-01	D6-103	P21S1		PT411	2TM-S1	Note 6

Note 1. Some versions may use a 10MFD ⓖ 400V in this application.
Note 2. Some versions may use a 20MFD ⓖ 25V in this application.
Note 3. Some versions may use a 4MFD ⓖ 350V in this application.
Note 4. Some versions may use a 40MFD ⓖ 30V in this application.
Note 5. Some versions may use a .0015MFD ⓖ 600V in this application.
Note 6. Used in versions using UHF tuners.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	83-3198	Q13-127	A47-1Meg-Z	AB-70	U-53	Volume
B	Shaft		Not Req.	KSS-3	AK-4	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	U-26	Attach to R1A
R2A	7.5Meg	½	83-2918	QU-142	A47-7.5Meg-S	AB-26	U-52	Focus
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	10Meg with 1Meg stop	½	83-2948	QU-143	A47-10Meg-S	AB-98	U-526	Height - Note
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	500KΩ	½	83-2937	QU-129	A47-500K-S	AB-46	U-530	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	75KΩ	1	83-2896	QU-125	A47-75K-S	AB-25	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-1	Not Req.	Attach to R5A
R6A	2500Ω	½	83-2971	QU-112	A47-3000-S	AB-7	SU-8	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	15KΩ		83-2976	QU-119	A47-15K-S	AB-20	SU-39	AGC
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8	3000Ω	4	83-2091			3S-999	M3M9K	Contrast -wire wound
R9	600Ω	½	83-3167			3S-600		Buzz - wire wound
R10A	4.5Meg	½	83-2208	QU-141	A47-5Meg-S	AB-87	SU-67	Fringe lock
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R10A

Note. Connect a 1Meg resistor in series with right hand terminal of control and the lead connecting to same terminal of the original control (control viewed from shaft end terminals down).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R11	47KΩ	½	83-1856	BTS-47K	
R12	470KΩ	½	83-1897	BTS-470K	
R13	27KΩ	½	83-1845	BTS-27K	
R14	47Ω	½	83-1729	BTS-47	
R15	100KΩ	½	83-1869	BTS-100K	
R16	100KΩ	½	83-1869	BTS-100K	
R17	220Ω	½	83-1788	BTS-220	
R18	4700Ω	½	83-1813	BTS-4700	
R19	470Ω	½	83-1772	BTS-470	
R20	68KΩ	½	83-1862	BTS-68K	
R21	100KΩ	½	83-1869	BTS-100K	
R22	82KΩ	½	83-1864	BTS-82K	
R23	2200Ω	½	83-1789	BTS-2200	
R24	2200Ω	½	83-1789	BTS-2200	
R25	10KΩ	2	83-3170	BTB-10K	
R26	22KΩ	½	83-1729	BTS-22K	
R27	68Ω	½	83-1727	BTS-68	
R28	50Ω	½	83-1725	BTS-50	
R29	180Ω	½	83-1754	BTS-180	
R30	470Ω	½	83-1772	BTS-470	
R31	27KΩ	½	83-1841	BTS-27K	Note 1
R33	680Ω	½	83-1821	BTS-680Ω	
R33	120KΩ	½	83-1873	BTS-120K	Note 5
R34	15Ω	½	83-1708	BTS-15	
R35	12KΩ	½	83-1877	BTS-12K	Note 2
R36	120KΩ	½	83-1873	BTS-120K	
R37	470Ω	½	83-1772	BTS-470	
R38	270Ω 5%	½	83-1760	BTS-270	
R39	150Ω	½	83-1750	BTS-150	
R40	8200Ω	2	83-1801	BTB-8200	
R41	15KΩ	½	83-1834	BTS-15K	
R42	15Ω	½	83-1708	BTS-15	
R43	22KΩ	2	83-942	BTB-22K	Note 3
R44	100KΩ	½	83-1869	BTS-100K	
R45	100KΩ	½	83-1869	BTS-100K	
R46	33KΩ	½	83-1848	BTS-33K	
R47	47KΩ	½	83-1855	BTS-47K	
R48	10 Meg	½	83-1961	BTS-10 Meg	
R49	680Ω	1	83-3290	BTA-680	
R50	220KΩ	½	83-1884	BTS-220K	
R51	3900Ω	½	83-1810	BTS-3900	
R52	180KΩ	1	83-2213	BTA-180K	
R53	220KΩ	½	83-1884	BTS-220K	
R54	220KΩ	½	83-1884	BTS-220K	
R55	680KΩ	½	83-1904	BTS-680K	
R56	2.2Meg	½	83-1926	BTS-2.2Meg	
R57	100KΩ	½	83-1870	BTS-100K	
R58	10KΩ	2	83-1857	BTS-10K	
R59	22KΩ	2	83-2141	BTB-22K	
R60	680Ω	½	83-1779	BTS-680	
R61	680KΩ	½	83-1904	BTS-680K	
R62	6.8Meg	1	83-1947	BTS-6.8Meg	Note 4
R63	82Ω	½	83-2290	BTA-680	
R64	22KΩ	½	83-1842	BTS-22K	Note 5
R65	470Ω	½	83-1771	BTS-470	
R66	470KΩ	½	83-1897	BTS-470K	
R67	100KΩ	½	83-1869	BTS-100K	
R68	470KΩ	½	83-1897	BTS-470K	
R69	56KΩ	½	83-1859	BTS-56K	
R70	220KΩ	½	83-1883	BTS-220K	
R71	47KΩ	½	83-1855	BTS-47K	
R72	22KΩ	½	83-1841	BTS-22K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R73	100KΩ	½	83-1869	BTS-100K	
R74	100Ω	½	83-1744	BTS-100	
R75	1.5Meg	½	83-1922	BTS-1.5Meg	
R76	180KΩ	½	83-1870	BTS-100K	
R77	1000Ω	1	83-945	BTA-1000	
R78	560Ω	½	83-1775	BTS-560	
R79	560Ω	½	83-1775	BTS-560	
R80	1 Meg	½	83-1961	BTS-1 Meg	
R81	1 Meg	½	83-1961	BTS-1 Meg	
R82	1 Meg	½	83-1961	BTS-1 Meg	
R83	27KΩ	½	83-1845	BTS-27K	
R84	100Ω	½	83-1744	BTS-100	
R85	470Ω	½	83-1771	BTS-470	
R86	47KΩ	1	83-1194	BTA-47K	

Note 1. Some versions may use 22KΩ resistor in this application.
Note 2. Some versions may use 10KΩ resistor in this application.
Note 3. Some versions may use 15KΩ resistor in this application.
Note 4. Not used in all versions.
Note 5. Add this resistor for combination units only.

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R87	22KΩ	½	83-1842	BTS-22K	
R88	10KΩ	2	83-2145	BTB-10K	
R89	47KΩ	½	83-1856	BTS-47K	
R90	180KΩ	1	83-2213	BTA-180K	
R91	8600Ω	½	83-1820	BTS-8600	
R92	910Ω 5%	½	83-1764	BTS-91	
R93	470KΩ	½	83-1898	BTS-470K	
R94	12KΩ	2	83-1091	BTB-12K	
R95	52KΩ	1	83-958	BTA-52K	
R96	33KΩ	1	83-1849	BTA-33K	
R97	100KΩ	1	83-1870	BTA-100K	
R98	330Ω	1	83-3163	BTA-330	Note 4
R99	10KΩ	½		BTS-10K	Note 4
R100	8.2Ω				Note 4

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA ZENITH PART No.	Stancor PART No.	Merit PART No	Triad PART No	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T1	117VAC ⑤ 1.6A	524VCT ⑤ .250ADC	5VAC ⑤3A	95-1375						26R33 ①②③
	SEC. 3	SEC. 4	SEC. 5							
	12.6VCT ⑤ 4.4A									

① Use only one 5V winding.
② Series 6.3V windings for 12.6VCT.
③ Use universal mounting brackets.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T2	Horiz. Output Trans.	83-2993 ①			DA-36 ④			
T3	Vert. Output Trans.	95-1377	A-8148		A-108X ⑤			
T4A	Yoke-Horiz. (13MH)	95-1378	DY-9A ③	MDF-73 ③	Y-17-① ③	21UD8 ③	DF602 ③	Y-T ③
B	Vert. (42MH)	83-1898 ②						

① Winding and terminal assembly part #83-2107B.
② Centering device and yoke cover.
③ Use original yoke cover and positioning device.
④ See instruction sheet packed with unit for replacement procedure.
⑤ Connect an auto transformer.
⑥ Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordorson PART No.	NOTES
T5	9.4KΩ	4.2Ω	95-1379	A-3879	A-2932	S-51X	Z1117	24S60	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA ZENITH PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	4"	PM	4.2Ω	49-750	428	4A07	① Used in Models M2228RZ, M2229RZ, and M2229EZ
	5 1/4"	PM	4.2Ω	49-751 ①	525J4	5A1	② Used in Models M2250RZ, M2250FZ, M2250RU, M2250EU, M2252RZ, and M2252EZ
	10"	PM	4.2Ω	49-752 ②	1021I	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Series Police Trap	0Ω		20-490				
L2	Shunt Police Trap	0Ω		20-505				
L3	Series Police Trap	0Ω		20-490				
L4	Series Police Trap	0Ω		20-490				
L5	Shunt Police Trap	0Ω		20-505				
L6	Series Police Trap	0Ω		20-490				
L7A	Ant., RF Grid Coil	0Ω		S-21192				Channel 2
B	Ant., RF Grid Coil	0Ω		S-21193				Channel 3
C	Ant., RF Grid Coil	0Ω		S-21194				Channel 4
D	Ant., RF Grid Coil	0Ω		S-21195				Channel 5
E	Ant., RF Grid Coil	0Ω		S-21196				Channel 6
F	Ant., RF Grid Coil	0Ω		S-19847				Channel 7
G	Ant., RF Grid Coil	0Ω		S-19848				Channel 8

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
H	Ant., RF Grid Coil	0Ω		S-19849				Channel 9
I	Ant., RF Grid Coil	0Ω		S-19850				Channel 10
J	Ant., RF Grid Coil	0Ω		S-19851				Channel 11
K	Ant., RF Grid Coil	0Ω		S-19852				Channel 12
L	Ant., RF Grid Coil	0Ω		S-19853				Channel 13
L8	Fil. Choke	0Ω		20-391				
L9	Neut. Coil	0Ω		20-431				
L10	RF Coil	0Ω		20-484				
L11A	RF, Mixer Grid, Osc. Coil	0Ω		S-19863				Channel 2
B	RF, Mixer Grid, Osc. Coil	0Ω		S-19863				Channel 3
C	RF, Mixer Grid, Osc. Coil	0Ω		S-19864				Channel 4
D	RF, Mixer Grid, Osc. Coil	0Ω		S-19865				Channel 5
E	RF, Mixer Grid, Osc. Coil	0Ω		S-19866				Channel 6
F	RF, Mixer Grid, Osc. Coil	0Ω		S-19867				Channel 7
G	RF, Mixer Grid, Osc. Coil	0Ω		S-19868				Channel 8
H	RF, Mixer Grid, Osc. Coil	0Ω		S-19869				Channel 9
I	RF, Mixer Grid, Osc. Coil	0Ω		S-19870				Channel 10
J	RF, Mixer Grid, Osc. Coil	0Ω		S-19871				Channel 11
K	RF, Mixer Grid, Osc. Coil	0Ω		S-19872				Channel 12
L	RF, Mixer Grid, Osc. Coil	0Ω		S-19873				Channel 13
L12	Mixer Grid Coil	0Ω		20-485				
L13	Mixer Coil	0Ω		S-20181				
L14	Osc. Trimmer Coil	0Ω		20-447				
L15	IF Coil	0Ω		S-18859				
L16	Conv. Plate	0Ω		S-20902				
L17	1st Video IF	.1Ω		S-21018			6232	Includes trap
L18	Adj. Sound IF	.1Ω		S-18210		17-4502		
L19	39.75MC Trap	0Ω		S-20622		17-4501 *		
L20	2nd Video IF	.1Ω	.1Ω	S-17907			6232 ■	
L21	3rd Video IF	.1Ω	.1Ω	S-19952			6233 ■	
L22	4th Video IF	.3Ω	.3Ω	S-20623			6219	
L23	Series Peaking Coil	5.5Ω		S-17912	19-3160	TV-184	4644	145 Microhenries
L24	Shunt Peaking Coil	5.5Ω		S-21562	19-3160 *	TV-184 *	4644 *	159 Microhenries; wound on 2.7KΩ resistor
L25	Series Peaking Coil	1.5Ω		S-15128	19-1005		4613	12 Microhenries
L26	4.5MC Trap	12Ω	1.5Ω	S-21493				
L27	Series Peaking Coil	5Ω		S-21563	19-3125 †		6.53 †	136 Microhenries, wound on 5.6K-Ω resistor
L28	Sound IF	.3Ω	.3Ω	S-20219	19-3445			
L29	Quadrature Coil	4.8Ω		S-19020	20-1004	TV-151	1470	
L30	Horiz. Osc.	148Ω		S-19743	19-1577			Tapped @ 58Ω
L31	Anti-ringing coil	47Ω		S-21013	19-3160 ▲	TV-184 ▲	6180 ▲	163 Microhenries; wound on .01 cap; used in chassis 19M20Z, 19M21Z, 19M20UZ, 19M21UZ, 19M20, 19M21, 19M20U, 19M21U, 20M21, 20M21U, 20M21Z

* Use trap winding and drill mounting hole.
■ Detune trap.
● Series with a 5.6KΩ resistor.
† Parallel with a 5.6KΩ resistor.
▲ Parallel with a .01 capacitor.

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 Cps	REPLACEMENT DATA ZENITH PART No.	Stancor PART No	Merit PART No.	Triad PART No.	Halldorson PART No	Thordorson PART No
L32	.250ADC	88Ω	1.7 Hy.	95-1378	C-2326 ①	C-2996 ①	C-23X	C3037 ↓	26V44

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

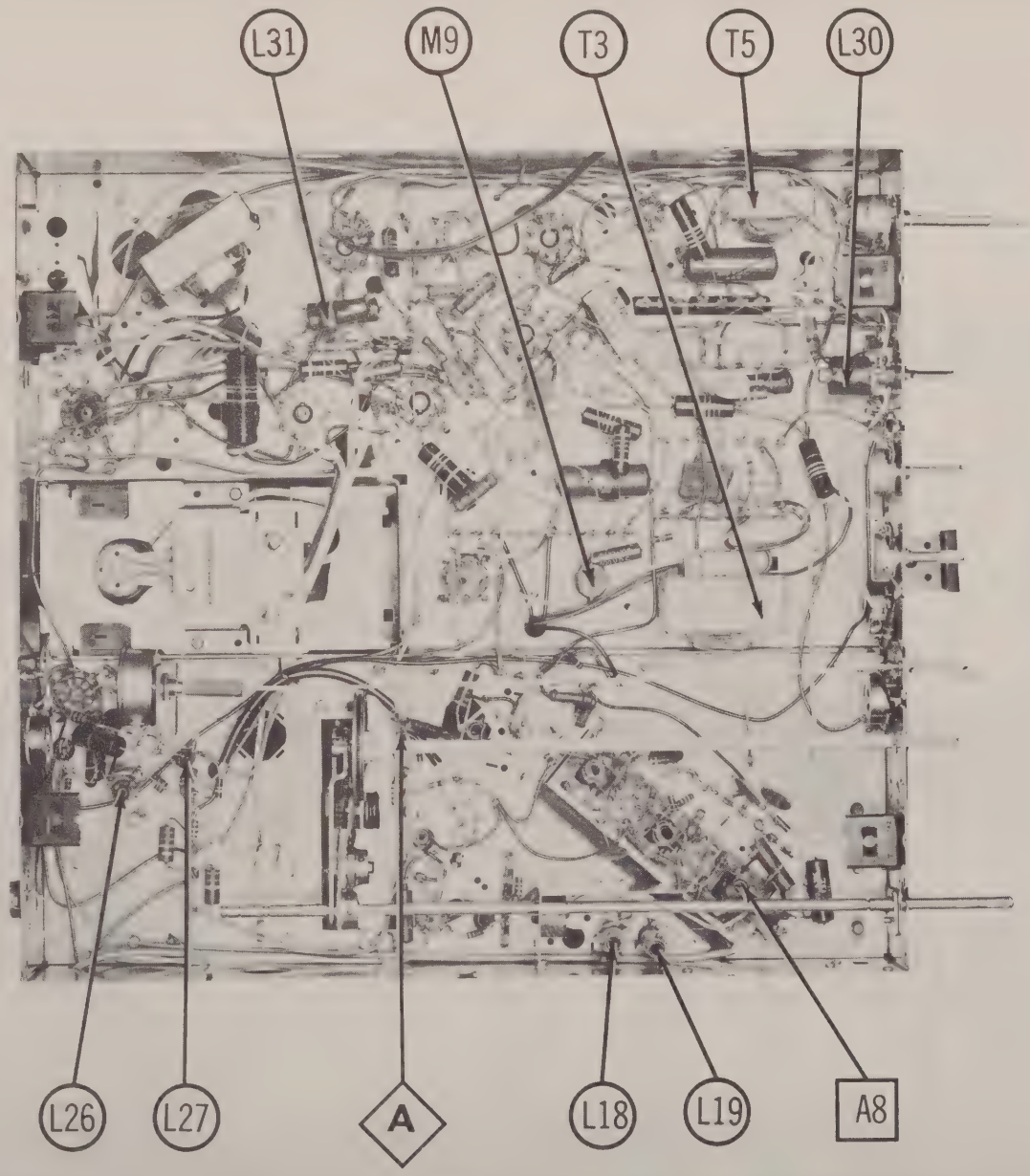
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG Slo-Blo	.175A 125V	136-21	83-1883	313.175 (175MA-3AG Slo-Blo)	357001	MDL 175/1000	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	1N60	103-1	1N60 or 1N132	1N60 or 1N64A	Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Dial Light	100-166	Not used in all models.
M4	Tuner	S-21060	VHF-UHF - Chassis 19M20, 19M21
	Tuner	S-20989	VHF- Chassis 19M20U, 19M21U
	Tuner	S-19970	VHF-UHF - Chassis 19M20Z, 19M21Z, 19M21UZ
	Tuner	S-21000	UHF - Chassis 19M20U, 19M21U
	Tuner	S-19670	UHF - Chassis 19M21UZ
M5	Video Det. Assy.	S-21042	Includes M2, L22, L23, L24, C81, C82
M6	Switch	85-546	UHF-VHF changeover - Chassis 19M20U, 19M21U
M7	Centering Device	S-19898	Includes yoke cover
M8	Ion Trap	S-17164	
M9	Integrator	87-1	
M10	Width Adjustment		
B1	Trimmer Cap.	22-2398	Horiz. Drive
	Cabinet	14-1648E	Blonde - Models M1800EZ, M1800E, M1800EU, R1800EZ, R1800EUZ, M2229E, M2230E, M2249E, M2250E, M2252E
	Cabinet	14-1648R	Mahogany - Models M1800RZ, M1800R, M1800RU, R1800RZ, R1800RUZ, M2228R, M2229R, M2230R, M2249R, M2250R, M2252R
	Cabinet	14-1650R	Mahogany - Models M2228RZ, M2228RU
	Cabinet	14-1651E	Blonde - Models M2229EZ, M2229EU, M2230EZ, M2230EU
	Cabinet	14-1651R	Mahogany - Models M2229RZ, M2229RU, M2230RZ, M2230RU
	Cabinet	14-1652R	Mahogany - Models M2250RZ, M2250RUZ, M2250RU, M2249RZ, M2249RU
	Cabinet	14-1652E	Blonde - Models M2250EZ, M2250EU, M2249EZ, M2249EU
	Cabinet	14-1655E	Blonde - Models M2252EZ, M2252EU
	Cabinet	14-1655R	Mahogany - Models M2252RZ, M2252RU
	Cabinet	14-1710R	Mahogany - Model M2230RZ2
	Cabinet	14-1740E	Blonde - Models R2258EUZ, R2258EZ
	Cabinet	14-1740R	Mahogany - Models R2258RUZ, R2258RZ
	Cabinet	14-1773E	Blonde - Models R2257EZ, R2257EUZ
	Cabinet	14-1773R	Mahogany - Models R2257RZ, R2257RUZ
	Cabinet	14-1742E	Blonde - Models R1812EZ, R1812EUZ
	Cabinet	14-1742R	Mahogany - Models R1812RZ, R1812RUZ
	Cabinet	14-1729	Metal - Models R2229RZ, R2229RUZ
	Cabinet	14-1730	Metal - Models R2229EZ, R2229EUZ
	Cabinet	14-1731	Metal - Models R2230RZ, R2230RUZ
	Cabinet	14-1732	Metal - Models R2230EZ, R2230EUZ
	Cabinet	14-1750	Models R2249RZ, R2249RUZ
	Cabinet	14-1751	Models R2249EZ, R2249EUZ
	Cabinet	14-1741E	Blonde - Models R2250EZ, R2250EUZ
	Cabinet	14-1741R	Mahogany - Models R2250RZ, R2250RUZ
	Safety Glass	192-176	Models M1800E, M1800R, M1800RZ, M1800EZ, M1800RU, M1800EU, R1800EZ, R1800EUZ, R1800RZ, R1800RUZ
	Safety Glass	192-168	Models M2228R, M2228RZ, M2229E, M2229R, M2229RZ, M2229EZ, M2228RU, M2229RU, M2229EU, R2229EZ, R2229RZ, R2230EZ, R2230RZ, R2249EZ, R2249RZ, R2229RUZ, R2229EUZ, R2230RUZ, R2230EUZ, R2249RUZ, R2249EUZ
	Safety Glass	192-175	Models M2250RZ, M2250EZ, M2250RU, M2250EU, M2252E, M2252R, M2252RZ, M2252EZ, M2252RU, M2252EU
	Safety Glass	192-178	Models M2230RZ2, M2230E, M2230R, M2250E, M2250R, M2230RZ, M2230EZ, M2230RU, M2230EU
	Safety Glass	192-154	Models M2249E, M2249R, M2249RZ, M2249EZ, M2249RU, M2249EU
	Safety Glass	192-91 or 192-77	Models R1812EZ, RZ, R1812RUZ, EUZ
	Safety Glass	192-188	Models R2250EZ, RZ, R2258EZ, RZ, R2258RUZ, EUZ
	Safety Glass	192-190	Models R2257EZ, RZ, EUZ, RUZ
	Mask	196-248	Models R2250EZ, RZ, R2258EZ, RZ, R2230RUZ, EUZ, R2258RUZ, EUZ
	Mask	196-259	Models R2257RZ, RUZ
	Mask	196-261	Models R2257EZ, EUZ



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15, V16 and V17. Check waveform W17. Check M1 fuse.

If Satisfactory	If UnSatisfactory
Check T2, T4A, R2, R94, R95, C78, C79 and other associated components.	Check L30, C74, C72, C73 C78, C77, C71, R86 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15, V16 and V18. Check C77, R94 and other associated components.

BLOOMING

Check by substitution V15, V16, V17 and V18. Check resistance wire to V17 filament. Check R94 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

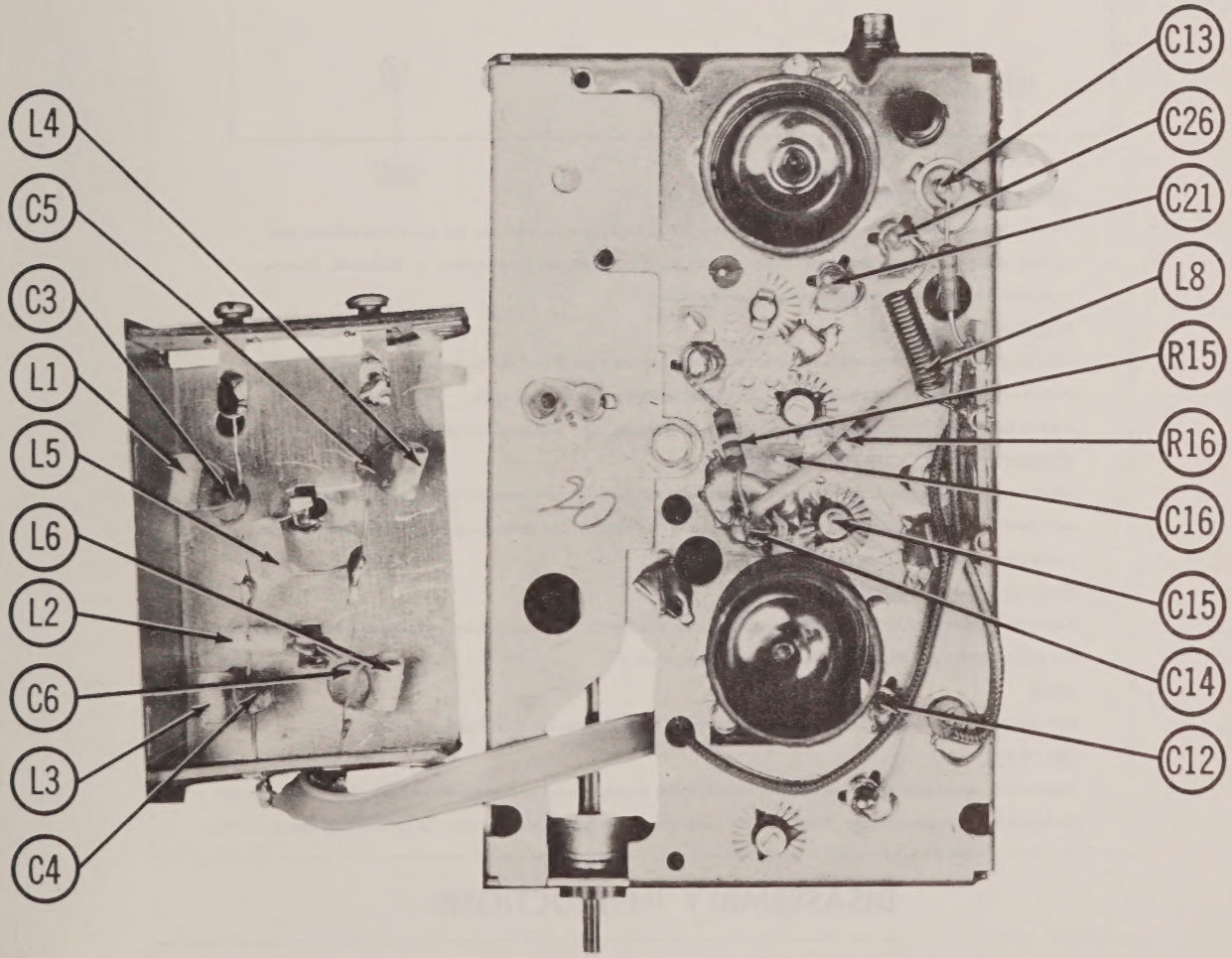
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



VHF TUNER TOP VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to its center of its range before making adjustments). Use alignment wrench 68-21 for adjustments.

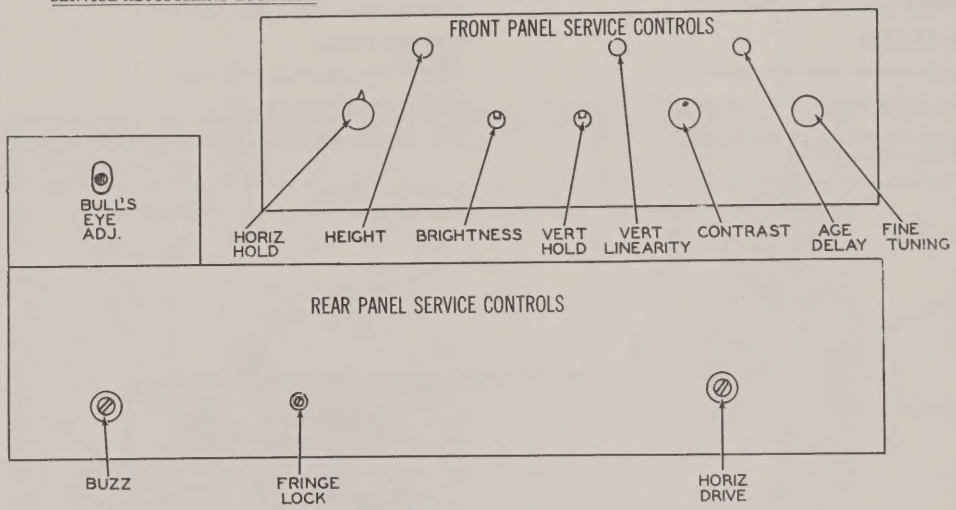
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 2 control knobs from each side of front panel. Remove 2 screws located under each knob. Remove both rings, then remove safety glass.

PICTURE TUBE REMOVAL

To remove picture tube it is necessary to remove safety glass, rear cover, tube socket, HV lead, ion trap and centering magnet. Remove 1 screw from top front of tube mount. Remove tube.

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC DELAY ADJUSTMENT

Turn the set on and tune in a TV signal and observe the picture. Starting from the full clockwise position turn the AGC delay control slowly counter clockwise until picture distorts and buzz is heard in the sound. Then turn control clockwise for clearest picture and best sound.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again.

Slightly retouch the fringe lock control adjustment, if necessary, for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel service control. Adjust the horizontal hold control (L30) until picture synchronizes horizontally. If results cannot be obtained see horizontal sweep circuit adjustments on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory see alignment instructions on pages 6 and 7.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

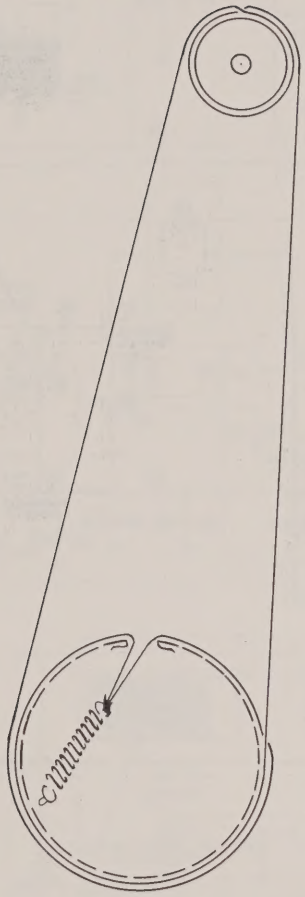
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 5 push-on type control knobs from front panel.
2. Remove 5 wood screws. Remove rear cover.
3. Disconnect speaker leads, and remove 2 speaker nuts. Remove speaker.
4. Remove 4 chassis bolts. Remove chassis.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



SHAFT IN MAXIMUM COUNTER CLOCKWISE POSITION.

DRIVE CORD STRINGING